International Entrepreneurship and Management Journal (2025) 21:110
https://doi.org/10.1007/s11365-025-01110-8

What is a circular entrepreneur? Understanding entrepreneurs' experiences in order to support the circular economy

Alessandra De Chiara[1]

Accepted: 26 March 2025 / Published online: 24 September 2025

Abstract

The circular economy proposes a model of economic development decoupled from environmental pressure, which aims to achieve a better balance between economy, environment and society, and which contributes to achieving sustainable development. Several research lines contribute to deepening this model, otherwise, the circular entrepreneurship is not sufficiently explored in the debate, yet it seems to be an interesting study perspective for the development of circular practices. This study aims to explore circular entrepreneurship in order to identify the enabling factors of the birth of these firms, and then to elicit information that feeds the development of circular enterprises. The study is based on a qualitative methodology with an exploratory multiple-case study, involving 11 Italian enterprises that are testing circular economy practices, selected mainly from the Italian Atlas of Circular Economy platform. Italy appears an interesting research context due to its excellent position in Europe in circularity performance; this context can provide a useful contribution to the study of circular entrepreneurship. The data collection uses direct interviews and secondary data for collecting useful information about the experiences of selected companies; the research design uses theoretical, methodological and data triangulation. The analysis demonstrates that three factors, which are strongly interconnected, can significantly influence the birth and development of circular enterprises: cross-fertilization of founders' expertise, an open innovation approach for the development of the innovation processes, and social capital for the strategic importance of links to the local system. In addition, the study suggests that a circular firm could play a multiplier role in the development of a circular practices within local economy. By bridging existing gaps, the study suggests academic implications advancing theoretical knowledge in the enabling factors of circular entrepreneurship and highlights practical implications for policymakers in stimulating the implementation of the circular firms, supporting cross-fertilization, open

Extended author information available on the last page of the article

innovation and social capital, and, prompts a more general political implications for a framework to facilitate the implementation of the circular economy.

Keywords Circular entrepreneur · Expertise · Skills · Cross-fertilization · Open innovation · Social capital · Italian companies

Introduction

The circular economy (CE) represents a model that can effectively contribute to achieving the sustainable development goals (SDGs). Adopted by the United Nations Member States in 2015 (United Nation General Assembly, 2015) and presented in Agenda 2030, SDGs are guiding governments in defining action programs in the environmental, social, economic and institutional fields, including many topics related to the CE. Europe gives great attention to the topic of the circular economy and already in 2015 the European Commission formalized a plan "The Action Plan for the Circular Economy," describing the circular economic model as an economy "in which the value of products, materials and resources is maintained as long as possible and the production of waste is reduced at a minimum" (European Commission, 2015, p. 1). On 11 March 2020, Ursula Von Der Leyen approved the new Circular Economy Action Plan, one of the main constituent elements of the European Green Deal, continuing European policy and strengthening it with the aim of transforming Europe into the first climate-neutral continent in 2050 (European Commission, 2020).

The CE has attracted increased attention within the sustainable development arena from the scientific debate too and several research lines contribute to deepening this topic. The debate explored various issues, but did not delve into the topic of circular entrepreneurship, although the entrepreneur is recognized as a pivotal actor in making the principles of the circular economy concrete (Zucchella & Urban, 2019) and in taking the opportunity that the CE offers (Geissdoerfer et al., 2017). The circular entrepreneur is defined as an agent who promotes change and exploits opportunities, stimulating the transformation toward a circular economy (Zucchella & Urban, 2019; Teixeira et al., 2023), however a theory specifically focused on entrepreneurship in the circular economy research area is currently lacking. In-fact many studies deal with terminological issues and the origins of the concept, starting from Boulding's study (1966), which fueled the debate on the closed-loop economy (Stahel & Reday-Mulvey, 1981), up to the most recent definitions which incorporate the three-dimensional concept of sustainable development (environmental, social and economic) (Korhonen et al., 2018). Other research has focused on issues relating to the business models (for example, Del Vecchio et al., 2024; Huynh, 2021; Lazarevic & Brandao, 2020; Mont et al., 2017) or to circular production and service delivery systems, aimed at providing customers with access to a function or service that a certain product provides, instead of selling the product (for example, Annosi et al., 2021; Brown & Ulgiati, 2011; Ghisellini et al., 2016; Murray et al., 2017). Some of the research has focused on the benefits produced by the circular economy, as it is expected to repair the damage to the environment, contributing to the current ecologi-

cal transition, while generating economic and social benefits (De Jong et al., 2015; Mies & Gold, 2021; Schröder et al., 2020). Further research has focused on the role of policymakers which are considered fundamental in switching an economy to a circular one (Ellen MacArthur Foundation, 2015; Košir & Kuenkel, 2022; Miedziński, 2018; Padilla-Rivera et al., 2020).

Therefore, the topic of circular entrepreneurship appears to be little investigated, so this paper aims to explore this issue which appears to be an interesting study perspective for identifying the possible enabling factors of the birth of these firm and then to elicit information that feeds the development of circular economy practices and encourages sustainable development.

The research methodology is based on non-systematic literature reviews (non-SLRs) (Kraus et al., 2022) and multiple-case analysis (Miles & Hubermann, 1994; Yin, 2009). It is suggested that non-SLRs be used in creating initial (or preliminary) conceptualizations and theoretic models in newly emerging topics (Kraus et al., 2022). Non-SLRs allow for the synthesis of literature on a research topic in a way that enables new theoretical frameworks to emerge (Torraco, 2005), reflecting the subjective evaluations and choices of the author.

The multiple-case analysis is conducted on 11 circular firms in Italy selected from two sources: The Italian Atlas of Circular Economy is an interactive web platform that records and recounts the experiences of the circular economy in Italy according to a series of indicators that consider all stages of the production process. This ranges from the choice of raw materials to design, from energy efficiency to logistics, from waste management to the creation of shared social value, and from territorial enhancement to the analysis of the entire supply chain. Along with the activities of other relevant Italian circular firms not included in Atlas, this data is used to maximize what can be learned (Stake, 1995).

Italy appears to be an interesting research context both for the excellent position held by Italy in circularity performance at European level (Circular Economy Network, 2023)- in second place for total number of patents in Europe related to the CE and with more than 210 circular startups (Observatory Circular Economy, 2024)- and for the Italian institutional response which, in the wake of European measures (EC, 2015, 2020), adopted two important documents of a strategic and programmatic nature to accelerate the transition towards the circular economy (Ministero della Transizione Ecologica, 2020, 2022).

This study adds to the literature on circular economy: the still under-researched perspective of entrepreneurship. The paper intends to investigate on the story of circular entrepreneurship, on the characteristics of its promoters and founders, and on their implementation of circular practices, attempting to answer the following research question: What is a circular entrepreneur and how do they design and implement circular innovation into business models?

Comprehensive knowledge of circular entrepreneurship is needed to stimulate the development of the circular economy on a micro-level, and to support policy in planning initiatives and tools to introduce circularity into business models. This creates new business opportunities, income, and jobs which shape a sustainable economy.

The paper is organized as follows. The first part is dedicated to the debate on the circular economy and entrepreneurship; the second part includes an empirical analysis and the results; and the third part includes discussions and implications.

Theoretical background

An interesting analysis of Kirchherr et al. (2017), on 114 definitions of the CE, synthetizes the key aspects of this concept: the replacement of the end-of-life concept with the reduction, re-use, recycling, and recovery of materials in production/distribution and in consumption processes, which act at the micro (products, companies, consumers), meso (eco-industrial parks), and macro (cities, regions, nations) levels. The CE is expected to repair damage to the environment and contribute to the current ecological transition while generating economic benefits and saving the global society for future generations (Mancuso, 2021). Then, within the sustainability paradigm (United Nation General Assembly, 2015), the circular economy approach plays an essential role (Geissdoerfer et al., 2017; Murray et al., 2017), and businesses are considered the major actors in the transition to the CE (Lüdeke-Freund et al., 2019; Urbinati et al., 2017), even if they seem to contribute in differing ways. For SMEs, this transition is easier (Stewart & Niero, 2018), while the start-ups can serve as a motivator for other market players (Rok & Kulik, 2020; Rizos et al., 2016), considering their important role in the circular economy innovation system.

The literature perceives entrepreneurship as a means of addressing persistent sustainability challenges (Shepherd & Patzelt, 2011) and perceives entrepreneur as a pivotal actor in taking the opportunity that the CE offers (Geissdoerfer et al., 2017; Zucchella & Urban, 2019).

With regard to the three levels (personal, company and macro level) proposed for classifying the literature on entrepreneurship in general (Porto Gómez et al., 2016; Xu et al., 2021), it can be noted that the literature has above all deepened the studies on circular entrepreneurship in relation to the company and the macro level. At the company level, the debate focuses on common characteristics of successful businesses, namely, the internal organization, strategic behavior, and corporate culture with related topics such as circular business models, business model strategies, and eco-innovation (Bocken et al., 2016; Demirel & Danisman, 2019; Lacy et al., 2016; Lieder & Rashid, 2016; Murray et al., 2017; Whalen, 2019).

At the macro level, the debate assumes the entire economy and society as the bearer of entrepreneurship itself. It pays greater attention to the interaction between entrepreneurs and their background, underlining the strategic importance of the complex interaction of a network of stakeholders, which contributes to the co-creation of an ecosystem shared value (Bailey et al., 2019; Pera et al., 2016). It also presents the industrial symbiosis approach as a key strategy, supporting the transition toward the circular economy (Baldassarre et al., 2019; Domenech et al., 2019; European Commission, 2015; Lüdeke-Freund et al., 2019). In addition, the debate considers people and communities as key actors (Mies & Gold, 2021; Schröder et al., 2020), inducing a cultural change and a radical rethinking of the consumption model in a

way that centralizes the role of the consumer (Knickmeyer, 2020; Rovanto & Bask, 2021; Stahel, 2019).

The personal level, little investigated in the debate on circular entrepreneurship, addresses individual characteristics of entrepreneurs, including innovation, the spirit of adventure and psychological characteristics, as well as cultural, economic, social, and environmental aspects (Porto Gómez et al., 2016; Xu et al., 2021).

In analyzing literature on the topic of the individual characteristic of circular entrepreneur, one aspect emerges as important: the entrepreneur's personality. Scholars speak of the strong sense of social and environmental responsibility that seems to distinguish the entrepreneur's personality; the circular entrepreneur pays special attention to environmental protection, human dignity, social sharing, and solidarity practices (Sawe et al., 2021; Welter et al., 2017; Zucchella & Urban, 2019). Some scholars recognize in an entrepreneur an interest in protecting the natural environment as an important end in itself rather than as merely a component of the economic goal (Affolderbach & Krueger, 2017). Others underline the strong sense of personal ambition and commitment to eliminating environmental threats and ensuring a healthy planet for future generations (Zucchella & Urban, 2019). A circular entrepreneur should be interested in innovating products and services to reduce the impact on the environment and increase people's quality of life (Schaltegger & Wagner, 2011) while contributing to sustainable development (Lans et al., 2014).

Some scholars use the term "passion" (Newman et al., 2021) in relation to the entrepreneur's attention on growth, change, competition, innovation, and social mission (Pagano et al., 2018). They recall the entrepreneur's personality based on ethical values, solidarity (Zucchella & Urban, 2019), preservation of the natural environment, and climate protection (Rok & Kulik, 2020), underlining that the desire to respond to social and environmental challenges not adequately addressed by public institutions very often translates into the identification of business opportunities (Santos, 2012). Others, therefore, describe the circular entrepreneur as one who proposes an innovation combined with a social intent (Candi et al., 2019), with the aim of generating social value. Hence, the circular entrepreneur can be compared to the social entrepreneur, who combines "business principles with a passion for social impact" (Wolk, 2008, p. 1), thus pursuing social value (Austin et al., 2006; Santos, 2012). In the debate, similarities and differences were sought between social entrepreneurs and business-oriented ones. Massetti (2008) finds that both are "passionate, driven individuals, who believe that their ideas will make the world a better place" (p. 4), while Santos (2012) states that "what distinguishes social entrepreneurship from commercial entrepreneurship is a predominant focus on value creation as opposed to value capture" (p.339).

Another research line refers to circular entrepreneurs' capabilities, identified in their ability to form relationships that support circular innovation (Aaboen et al., 2017; Pagano et al., 2018). Their ability to develop and assess collaborative and system-oriented business models is fundamental to the process of transition (Brown et al., 2020) and in integrating ecosystem perspectives into circular-oriented innovation (Bagherzadeh et al., 2021; Branca et al., 2020; Eisenreich et al., 2021; Greco et al., 2019; Konietzko et al., 2020).

Some scholars have highlighted the importance of social ties in the development of innovative ideas, which are essential to fostering the culture of circular economy practices (Dantas et al., 2022). To implement co-production practices and knowledge sharing, and therefore realize new circular products and services (Hettiarachchi et al., 2022; Potting et al., 2017; Zucchella & Urban, 2019), a circular entrepreneur requires various external actors such as associations, research institutes, other companies, and local authorities (Eisenreich et al., 2021).

The development of relationships outside and within the company is considered one of the main responsibilities of circular entrepreneurship (Zucchella & Urban, 2019). Several studies refer to the opportunities discovered within the local system, which involve the physical exchange of materials, energy, water, and/or by-products, enhanced by the industrial symbiosis approach.

At the same time, another context in which the circular entrepreneur must demonstrate his/her ability is the internal one. Recent studies highlighted the importance of combining skills and backgrounds to create new circular opportunities through collaboration among actors (Martínez-Pérez et al., 2019). Internal collaboration and integrating knowledge and skills within a circular company have positively influenced innovation processes (Schaltegger & Wagner, 2011).

Then, at personal level, studies seem to focus on three main dimensions (Fig. 1) which appear as enabling factors:

- personality (strong sense of environmental and social responsibility) (Sawe et al.,

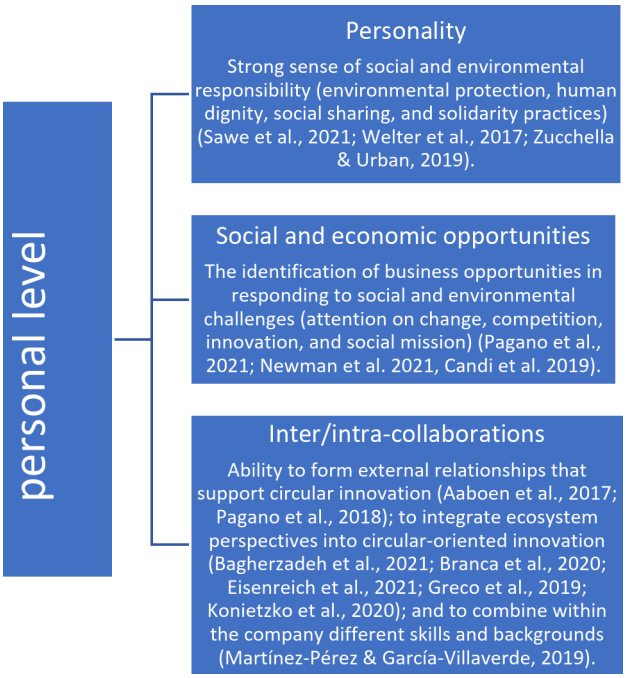

Fig. 1 Theoretical perspectives on individual characteristics of circular entrepreneurs

2021; Welter et al., 2017; Zucchella & Urban, 2019).
- an interest creating a social impact, which identifies business opportunities in responding to environmental and social challenges (Pagano et al., 2018; Newman et al., 2021; Candi et al., 2019).
- capability to form external and internal relationships that support circular innovation (Aaboen et al., 2017; Pagano et al., 2018; Greco et al., 2019; Martínez-Pérez at al., 2019; Bagherzadeh et al., 2021; Eisenreich et al., 2021).

Empirical research

The empirical analysis is based on qualitative methodology, adopting a multiple-case study approach (Miles & Hubermann, 1994; Yin, 2009). This is particularly useful in confirming emerging constructs independently, since it allows to analyze within and across settings and identifies complementary aspects of the phenomena under study (Baxter & Jack, 2008), aiming to understand the phenomena in their peculiarities and within the real context in which they manifest themselves (Stake, 2005, Yin & Pinnelli, 2005).

Research sample description

To address the research goal, the paper involved 11 cases study of Italian enterprises that are actively testing circular economy practices. The number of companies involved in the research aligns with other studies that adopt the same empirical approach in the field of circular economy (e.g. Ranta et al., 2021; Neri et al., 2023). Moreover, the focus is directed on the Italian country context, since Italy appears an interesting research context due to its excellent position in Europe in circularity performance, making it a valuable setting for exploring.

In order to identify the firms, a phenomenon-driven case selection approach (e.g., Fletcher et al., 2018) was employed, selecting cases that well represent the phenomenon of interest (Westphal & Shaw, 2005). Specifically, consistent with the research goal, 6 circular business cases (BioFaber, Lavandula, Oltrecafé, Orange Fiber, Packtin, The Circle Food & Energy Solutions) were identified from the Italian Atlas of Circular Economy, an interactive web platform that records and recounts the experiences of the economic and associative realities committed to applying the principles of the circular economy in Italy. In particular, it is created by the Documentation Center on Environmental Conflicts of A Sud Association (www.asud.net) with the support of Erion and born from the experiences of two Italian consortia RAEE (waste from electrical and electronic equipment). It assesses the circularity of each organization through a series of indicators that analyze all stages of the production process, from the choice of raw materials to design, from energy efficiency to logistics, from waste management to the creation of shared social value, and from territorial enhancement to the analysis of the entire supply chain.

To complement the sample, additional relevant Italian circular experiences (5 circular business cases) not included in the Atlas (Biova Project, Frumat, RiceHouse, Save the Waste, Vegea) are integrated.

Moreover, the procedure ensured that the sample included firms belonging to various industries and geographical regions across Italy (north, center, and south) to capture a wide range of sectorial experiences. This variety enables to collect testimonies coming from multiple sectorial experiences, thereby creating the opportunity for maximizing what can be learned (Stake, 1995). Furthermore, all selected firms are all for-profit organizations, thereby facilitating meaningful comparisons.

Finally, firms with available data, with respect to the objectives of the current research, were selected.

Table 1 provides an overview of the 11 circular enterprises in the sample, underscoring their key characteristics and their practical contribution to circular economy.

The sampled firms are:

BioFaber was created in 2014 in Brindisi, the citadel of research, though the current headquarters is in Mesagne, in the province of Lecce. The Apulian territory, characterized mainly by an economy linked to the agro-industry, represents the starting point of BioFaber. In fact, the company is based on the creation of new and innovative eco-friendly and nanostructured materials, capable of using agro-food waste, in which Puglia is rich.
The idea of furthering research on bacterial cellulose, an eco-innovative polymer, came from a group of researchers with various areas of expertise in experimental architecture and eco-design, as well as in nanotechnology and cell cultures.

Biova was created in 2019 in Torino, and takes its name from the typical bread of Piedmont, the region where the project was born and developed. It has a very specific circular economy project: to transform unsold bread into craft beer. Its slogan is "Even the best bread ages, unless it becomes beer".
Biova uses typical bread made with ancient flours such as barbarìa, which means the beer is a light one, with a sweet taste derived from the cereals present in the bread. The idea was developed by a group of people with shared values and ethical principles who came together to create a company based on sustainability.

Frumat was founded in 2008 in Bolzano, in an area (Trentino Alto Adige) with about 18,000 hectares of orchards for the cultivation of apples. Based on the goal of understanding whether it was possible to obtain environmentally friendly products from the waste of the industrial processing of apples, Frumat was born. Today, it reuses 50% of fruit waste, responding to both the local issue of apple waste and the growing demand for ecological alternatives, thereby giving life to a virtuous example of the circular economy. From the recycling of peels and cores, the company obtains a cellulose-based material, characterized by a variety of textures, thicknesses, and embossing, which allows it to be used in various sectors and to be easily produced and customized on request. The idea was born from the intuition of two South-Tyrolean engineers.

Table 1 Characteristics of the sample

Category	1.BioFaber	2.Biova Project	3.Frumat	4.Lavandula	5.Oltrecafé	6.Orange Fiber	7.Packtin	8.RiceHouse	9.Save the Waste	10.The Circle food & energy solutions	11. Vegea
Geographical area	South	North	North	South	North	South	North	North	North	Central	North
N. of employees	0–14	0–14	Not available	0–14	0–14	Not available	0–14	0–14	Not available	15–30	0–14
Category/Sector	Nano-structured bio-materials	Food- second raw material	Packaging, paper, coatings	Cosmetics	Pellet	Textile fibers	Packaging and preservatives	Construction	Packaging	Food	Textile fibers and coatings
Circular practices	Processing of bacterial cellulose for the production of eco-friendly leather and hydrogel	Transformation of unsold bread for beer production	Processing of industrial apple waste for the production of eco-friendly coatings	Processing of industrial food waste for the production of cosmetics products	Collection of coffee grounds for the production of pellets	Processing of industrial citrus fruit waste for textile production	Processing of industrial food waste for the production of natural preservatives and bio-packaging	Processing of rice waste for construction products and building with more energy efficiency	Processing of industrial bean waste for the production of bio-packaging	Agricultural firm with an aquaponic system	Processing of industrial wine waste for the production of textiles and coatings
Target	B2 C B2B	B2 C B2B	B2 C B2B	B2 C B2B	B2 C B2B	B2B	B2B	B2B B2 C	B2B	B2B B2 C	B2B
Stage of development	Early	Early	Early	Early	Early	Early	Early	Early	Growth	Early	Early
Type of realty	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit

Lavandula was born in 2016 from the idea of a young chemist who decided to create a laboratory for the production of personal hygiene and cosmetic products that could tell the story of the area in which it is located, namely, Cilento. The company's products are the result of the study of active ingredients and/or phytocomplexes to be applied to natural and ecobio cosmetic formulas. By-products from the agro-food chain are used to create cosmetic lines with special claims built around the active ingredient, turning what is considered waste into a resource and a job opportunity for those inside or outside the company. The company's activity revolves around three areas: spontaneous officinal plants, ancient local cosmetic recipes, and the use of agro-food waste as a source of molecules for cosmetic application. The raw materials used are ecobio and, as much as possible, km0.

Oltrecafé is a start-up in Modena specializing in the collection and recycling of used coffee grounds and in the creation of the first coffee-flavored pellets for stoves and boilers produced entirely in Italy. The company was founded in 2015, from the idea of an environmental engineer who involved two of her friends to set up a business that could respond to the growing demand for energy. The company offers a 100% renewable product that helps reduce environmental impact and heating costs while promoting the economic and social development of communities with a view toward "more work and less waste."

Orange Fiber was born in February 2014 from the idea of two young entrepreneurs with skills in innovative textile fibers and marketing. The entrepreneurial idea of creating a sustainable fabric, subjected to a feasibility study conducted with the Materials Chemistry laboratory of Milan Polytechnic, led to the development of a patent.
The business was established with offices in Sicilia and Trentino. In September of the 2014, the world's first fabric made from citrus waste, comprised of citrus acetate and silk, was presented in preview.

Packtin is a spin-off of the University of Modena and Reggio Emilia that develops products of interest for food packaging, giving life to a circular bioeconomy at the local level. The company was founded in 2017 by young researchers in green chemistry, food microbiology, industrial biotechnology and biopolymers, sensitive to the concepts of sustainability and the circular economy. The company's mission is to create a supply chain for the recovery of agri-food waste, aimed at extracting natural polymers and bioactive compounds through an innovative process. Its research focuses on the valorization of waste from agri-food chains and on bio-based packaging. The business idea is to merge these two sectors into a circular economic supply chain and thereby create an industrial model based on the reuse and recycling of waste to produce completely natural, safe, and eco-sustainable raw materials for use in consumer products.

RiceHouse is a start-up born in Andorno Micca, in the province of Biella (Italy), in an area where 90% of Italian rice is produced. Here was born the idea of using rice-processing waste to create highly energy-efficient buildings with a view toward saving and respecting the environment. The result was RiceHouse, a company founded in 2016 by two architects, whose mission is to encourage and promote the use of eco-sustainable materials according to the principles of bio-architecture, thereby producing a responsible change in society.

Save the Waste is a wide-ranging project that supports agricultural communities, allocates resources to ethical and social projects, and creates products that respect the environment by reusing vegetable waste. The project gave shape to the first paper for eco-sustainable packaging: 100% recyclable, obtained from bean processing waste, and the only one certified for direct contact with food, without the need for further packaging.
Save the Waste was born in 2015 from a partnership among three companies strongly rooted in the Vicenza area: Pedon, Favini, and Lucaprint.

The Circle food & energy solutions was created on a two-hectare piece of land in the Roman countryside (Monte Porzio Catone) by four young entrepreneurs, with skills in biotechnology and humanities, who in 2017 built a high-tech farm to produce quality food.
The company consists of a completely sustainable greenhouse that uses aquaponic technology, a recirculation system in which water, through the use of one or more pumps, is taken from a tank in which fish are raised. After being filtered and purified, the water directly irrigates the roots of the vegetables contained within vertical structures, entirely out of the ground, and then returns to the rearing tank.

Vegea is a start-up that produces innovative vegetable materials in the fashion and design sectors. In particular, the company has devised a system for recycling waste from wine production and obtaining eco-sustainable vegetable yarns.
Vegea was founded in 2016 in Milan, by two young founders, an architect and an industrial chemist, with the aim of promoting the integration of chemistry and agriculture through the development of new eco-sustainable products, as well as alternatives to materials of animal origin and all materials derived from non-renewable fossil sources.

Data collection

The multiple-case study method encompasses several methods for collecting data, in order to better support the validity of the case study, in accordance with prior lit-

erature (Eisenhardt, 1989; Meyer, 2001; Patton, 2002). Indeed, building upon recent studies (Abbate et al., 2023), the analysis relies on both secondary and primary data for collecting information. The collection of secondary data, in October 2022, preceded that of primary data.

Accordingly, the secondary data related to each business case have been collected referring to several sources:

- Firms' documents available on the Italian Atlas of Circular Economy (www.economiacircolare.com), that provides a descriptive scheme for each organization mapped, related to the company profile, the history, the circularity, and sustainability policies.
- The business websites, to collect all useful information about the history of selected companies. Attention was paid to the company profile, shareholder structure, and ties with the local system. More than 40 articles from the specialized press and several YouTube videos have been collected.

With reference to primary data, the analysis gathered information from direct interviews and informal speeches with at least one of the founders that hold various management roles in the company (CEO, president, general manager). The interview was preceded by sending information to the interviewees regarding the objectives of the research and the general topics addressed in the interview. The interviews were carried out via a video conferencing system; in two cases a face-to-face interview was implemented – in the case of Lavandula and The Circle- in the period November–December 2022.

Specifically, the analysis followed an ad hoc interview protocol to delve into the circular entrepreneurial business cases, based on prior researches (Colucci & Vecchi, 2021; Palombi et al., 2024; Monteverde & Runfola, 2024). The interview guide comprised open-ended questions divided into the following main sections (Fig. 2): company profile, with a focus on the professional profile of the founders; circular business models; business network and benefits obtained.

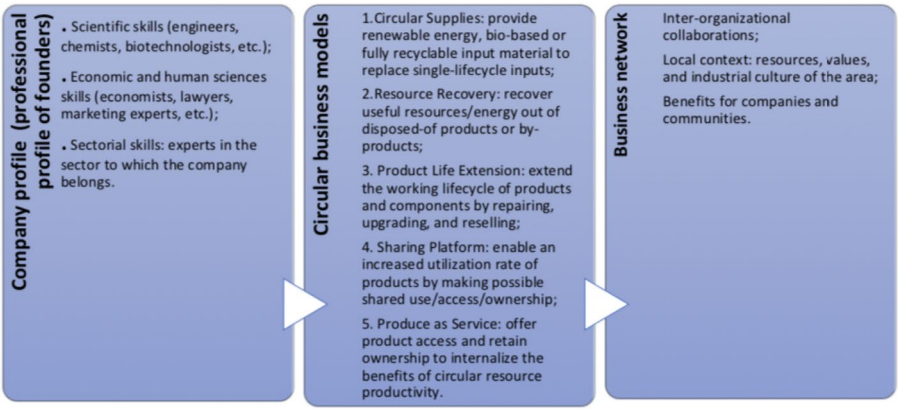

Fig. 2 Interview protocol with investigation elements

Data analysis process and validation

Drawing on the study by Bowen et al. (2024), data were processed by following three phases. Each phase (*Phase 1; Phase 2; Phase 3*) was conducted autonomously, ensuring that the data collected were analyzed separately before proceeding to triangulation. This process allowed for the integration of findings from both phases, enabling a more comprehensive and reliable interpretation.

Phase 1, regarding the collection and analysis of secondary data, is articulated in the following stages:

1. The collection of the data sheets of companies included in the Atlas, in order to collect uniform information for each organization.
2. The analysis of each data sheet and manually transcribed through notes on the investigation elements, related to company profile, the history, and the circularity practices.
3. The use of company websites, of specialized press and of YouTube videos in order to collect all useful information. Addition information regarding company profile, its history and founders are further manually transcribed.

Furthermore, Phase 2 includes qualitative analysis of direct interviews. Prior to the interview phase, information on research objectives were sent to the interviewees for ensuring alignment and shedding light on the interview's matter. During the interview, which lasted an average of two hours, the interviewer took notes for facilitating the coding process. In order to clarify some aspects that required further investigation and if there were inconsistencies between data sources, follow-up communication was conducted with the same interviewees. In particular, the same interviewees were contacted in order to answer additional questions via email, phone calls, and, in three cases, a second round of interviews, during the period January–February 2023, thereby facilitating a deeper understanding of available data.

Finally, based on the previous phases, Phase 3 relied on triangulation procedure to mitigate biases and enhance reliability and validity of the research (Jick, 1979; Eisenhart, 1989; Yin, 1994). In particular, this phase was implemented integrating three distinct approaches:

1. Data triangulation: the adoption of data from multiple sources, including interviews, archival from company's web site and Atlas, observational from the videos. Following prior studies (Jack & Raturi, 2006), these data were collected at differing times, thus strengthening research findings by using multiple data collection methods.
2. Methodologic triangulation: specifically, within-method triangulation, the use of more data collection procedures which form the same design approach (Thurmond, 2001).
3. Theoretical triangulation: the adoption of multiple theories in order to provide a broader, deeper analysis of findings (Banik, 1993; Thurmond, 2001). It is believed that this research process can lead to identifying the factors that describe the circular entrepreneur, allowing the transferability of the results so that they

can serve to develop assertions and theories that can be used as a model to analyze other cases.

Findings

Circular entrepreneurship seems to be the result of interactive processes of experts in several fields. The interviews highlighted the specificities regarding the professional profile of the promoters of circular businesses and explained how circular innovation actually arose from the complementarity of the promoters' knowledge. The founders possess mostly scientific skills that belong to several branches of knowledge (biotechnology, biology, chemistry, nanotechnology, etc.) (Table 2). The new ideas are fed by the development of founders' skills as they join a range of perspectives and knowledge to create a completely new technological domain. The expansion of knowledge creates a strong complementarity and transdisciplinarity among promoters' competences, which produces innovation. This is evidenced in many of the

Table 2 Educational founders' profiles

Circular firms	*N*. of founders	Scientific fields
BioFaber	3	Architecture and experimental design Vegetal Biotechnology Nanotechnology
Biova Project	5	Communication (2 founders) Green economy Sectorial skills: (beer sector) (2 founders)
Frumat	3	Engineering Architecture Law
Lavandula	1	Astrobiologist
Oltrecafé	1	Environmental engineering
Orange Fiber	2	Marketing Fashion design and innovative textile fibers
Packtin	5	Agri-food technologies Agri-food Sciences, Technologies and biotechnologies Food Science and Technology (2 founders) Food Microbiology and Microbiological techniques
RiceHouse	2	Architecture Geology
Save the Waste	3	Sectorial skills: (food; packaging and paper factory)
The Circle	4	Industrial biotechnology Economics Political science
Vegea	2	Architecture Industrial chemistry

stories told by companies and is shown in the following sentences (from secondary data):

> *"…a team of researchers with different expertise in experimental architecture and eco-design, in nanotechnology and in cell cultures, gathered around a cup of fermented tea, a drink also resulting from the fermentation of bacteria and yeasts, and rich in antioxidant properties" (BioFaber-*https://www.youtube.com/watch?v=NsjPab98rTI. *);*

> *"A company made up of 5 members with different skills (CEO & founding partner, specialized in innovative textile fibers; CMO & founding partner, specialized in marketing, communication and fundraising; two entrepreneurs and a lawyer)" (Orange Fiber, web-site);*

> *"…two founders: an architect and an industrial chemist, who, driven by the desire to find eco-sustainable solutions for the fashion sector, embarked on a research path and invested [in] develop[ing] an innovative technology for the production of bio-based technical fabrics" (Vegea,* https://www.alternativasostenibile.it/articolo/circular-economy-la-start-italiana-vegea-al-parlamento-europeo*).*

Concerning the circular economy models pursued by the investigated firms, the research shows that circular entrepreneurs have mostly implemented a model called resource recovery, regarding the recycling of the production waste of other firms to create new resources, secondary raw materials, or products. In only a few cases is the recovered waste generated from the same business production process.

Circular firms are born mostly from the idea of recycling waste from the food industry to create new materials for packaging, coating, textiles, and new products (Fig. 3), from the processing of bacterial cellulose to the creation of "green skin" and hydrogel (BioFaber); to citrus waste for the production of ecological fabrics (Orange Fiber); to the recovery of agri-food waste, aimed at extracting natural polymers and

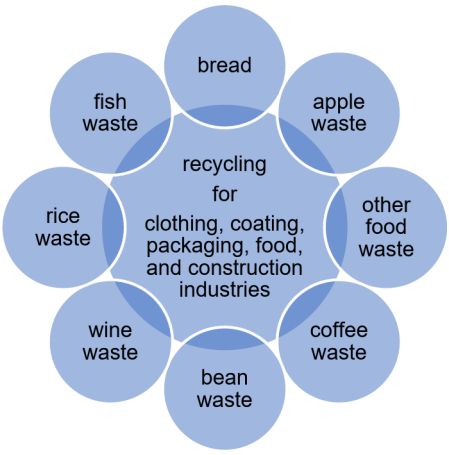

Fig. 3 Resource recovery for secondary raw materials and new products

bioactive compounds for the creation of food packaging (Packtin); to using rice processing waste in the construction of high-energy-efficiency buildings (RiceHouse); to using waste from the processing of beans in the creation of eco-sustainable packaging (Save the Waste); to cultivating aquaponic plants (The Circle); and to recycling waste from wine production to obtain eco-sustainable vegetable yarns (Vegea).

The circular idea is strongly linked to the territory to which the founders belong. They tell the story of their territories and describe their specificities, values, and industrial cultures as a positive value. Some significant sentences on the value of the territory, taken from companies' stories, are shown in the Table 3.

The interviews clearly highlight that circular ideas are born by taking inspiration from the territory. The territoriality brings together many experiences of the circular firms. The Apulian territory, which is rich in companies that produce agro-food products, is the starting point of BioFaber, while apple crops in Trentino Alto Adige (a region in Italy) have stimulated the idea, in the Frumat company, of using waste from industrial apple processing. Meanwhile, the agro-industrial production of the artichoke in the Piana del Sele, as well as interpersonal relationships between some players in the area, are the bases of the idea of natural Lavandula cosmetics. From the orange, a product typical of the Catanian landscape, which is the area of origin of the two promoters, was born the idea of Orange Fiber, using the scraps of citrus processing. In the province of Biella, where about 90% of Italian rice is produced, RiceHouse's idea of using the waste from rice processing for the construction of buildings was born. Finally, the Save the Waste project was born from the partnership between three companies strongly rooted in the Vicenza area (Pedon, Favini, and Lucaprint).

Great importance is assigned by interviewees to local inter-organizational collaboration. Founders illustrate the importance of having strong ties with local actors, in the role of suppliers of materials—which will become secondary raw material for circular firms—and of industrial partners for the development of industrial processes (Table 4). In Biofaber the supply of molasses, pomace and vegetation water comes

Table 3 The value of the territory in the companies' stories

"BioFaber was born in 2015 in Salento, a land rich in food products, as a solution to the waste and by-products of the agro-food processing industry" (from web-site);
"Lavandula is a research and development laboratory in natural cosmetics, which with its products try to tell the soul of a land, Cilento" (interviewee 4);
"The goal is to strengthen the relationships and bonds that are created on the territory between companies, citizens and public administrations, which means increasing the quality of life (and the environment) of all the actors involved and the attractiveness of the territory" (Oltrecafè, from secondary data);
"…in the city famous for the production of apples and fruit juices. The company aims to maintain a close relationship with the territory by purchasing most of the raw materials from producers in the area or in any case not far from its headquarters. In this way, in addition to sustainability, Frumat enhances local resources and economic fabric" (Frumat, from secondary data);
"This supply chain model involves all the figures present in the supply chain, a constitutive part of the social and economic fabric that revolves around the production of rice" (interviewee 8).

Table 4 Entrepreneurial characteristics of investigated circular firms

Circular firms	Entrepreneurial competences (set of knowledge)	Social and environmental responsibility/business opportunities	Collaboration ability (inter-collaboration and open innovation)
BioFaber	Strong presence of scientific skills in different disciplinary areas (experts in cell cultures, in nanostructure, in eco-design) and ability to use different scientific and technological knowledge and methodologies.	Salento, place in Puglia, is a land rich in food products. The company wants to be a solution to the waste and by-products of the agro-food processing industry.	Strong links with local food companies in Salento from which company collects food waste (molasses, pomace and vegetation waters) Business network produces benefits both for industrial actors, through a reduction of disposal costs, both for the community thanks to the lack of emissions generated by the combustion of waste.
Biova Project	Integration of knowledge from different human sciences contexts (experts in green economy and communication) and sector-specific skills.	Bread represents one of the largest waste products in the food sector. "The waste of this food, even if the cost is modest, produces very strong feelings of guilt, because it has a sort of sacredness as a primordial food"	Collaboration with local wood-fired ovens that deliver unsold bread. Leftover bread does not always turn into breadcrumbs or feed and becomes waste. If the bread is produced for large-scale distribution (GDO) and remains unsold, an additional burden is generated for the bakers, who must collect it and reimburse the amount unsold.
Frumat	Integration of knowledge from different disciplinary areas. Presence of scientific skills (expert in engineering and bio architecture) and in legal field.	Close relationship with the territory (Trentino) for its apple crops, hence the idea of using the waste from industrial apple processing.	Frumat purchases most of its raw material from industries in the area that produces juices. Food companies, instead of bearing the cost of disposal, supply Frumat, which, in this way, in addition to sustainability, enhances resources and the local economic system.
Lavandula	Scientific skill (expert in biology).	The artichoke cultivation is particularly widespread in the Sele Plain (near Paestum place), it is the second most exported agri-food product in the area. Company individuated a business opportunity in the utilization of artichoke waste and the entrepreneur expressed the desire not to move away from her territory of origin	Partnership with a local firm that provides artichoke waste and commercial expertise. An open innovation process with the University of Salerno which carries out research, analysis, and tests necessary for cosmetics products. Lavandula is seeking to engage the National Parc of Cilento, an important institutional stakeholder. The benefits are individuated in disposal costs and the enhancement of local culture and knowledge.

Table 4 (continued)

Circular firms	Entrepreneurial competences (set of knowledge)	Social and environmental responsibility/business opportunities	Collaboration ability (inter-collaboration and open innovation)
Oltrecafé	Scientific skill (expert in environmental engineering).	From the union of good practices, already tested abroad, and from the opportunity to respond in a green way to the growing demand for energy, the idea of offering a 100% renewable product was born. A product that reduces environmental impact and the costs of heating.	Local suppliers of remainders coffee. The benefits are individuated in a better environmental performance and increasing in the quality of life and the attractiveness of the territory.
Orange Fiber	Integration of different knowledge (experts in innovative textile fibers and fashion design and in communication).	The company's mission is to create circular fabrics using citrus fruit waste, after the processing of citrus juice by Sicilian companies. The disposal of waste from these processes have instead a considerable economic and environmental cost.	Local industrial companies of citrus juice (Sicilia). An open innovation process with different partners (local, national, and international) for the development of industrial processes and of new products.
Packtin	Strong presence of scientific skills in different disciplinary areas (experts in green chemistry; agri-food sciences, technologies and biotechnologies and microbiological techniques).	The company valorizes waste from the agri-food supply chains and creates bio-based packaging. The business idea is to create an industrial model based on the reuse and recycling of waste so as to produce completely natural, safe and eco-sustainable second raw materials, to be used on consumer products.	Partnership with not only local suppliers of food waste. Collaboration with the University of Modena and Reggio Emilia for validation of products in the phase of patent pending. Double valorization of food waste. Firm's slogan: Using food waste to avoid food loss.
RiceHouse	Integration of knowledge in scientific area (experts in bio-architecture and geology).	The aim is to create a positive impact on society, promoting responsible change. Ricehouse's mission is to create highly energy-efficient buildings, using the by-products that derive from the rice supply chain, located mainly in the province of Biella (Italy).	Local suppliers of rice waste, located in the province of Biella (Italy). The benefits are individuated in a reduction of disposal costs and emissions generated by the combustion of rice waste; in achieving energy efficiency of the building; in the biodegradability of products.
Save the Waste	Integration of specific sectorial knowledge in food, packaging and in paper factory.	Supporting agricultural communities, allocating resources to ethical and social projects and producing respecting the environmental by reusing plant waste.	The project arises from a partnership between three firms highly established in the territory of the province of Vicenza (Italy). The need to put together different partners (the producer of waste, the transformer, and the final user) enables the creation of a network of synergic values among different business sectors, leading all partners to earn knowledge and profit.

Table 4 (continued)

Circular firms	Entrepreneurial competences (set of knowledge)	Social and environmental responsibility/business opportunities	Collaboration ability (inter-collaboration and open innovation)
The Circle	Presence of different knowledge and integration of skills in scientific field (expert in industrial biotechnology) and human sciences (economics and political science).	Create a high-tech agricultural company to produce quality and sustainable food.	Collaborations with local partners of food service. Producing sustainable and quality agri-food, thus allowing catering partners to differentiate themselves from local and national competitors.
Vegea	Integration of knowledge in scientific area (expert in bio architecture and industrial chemistry).	Italy is the largest producer of wine (about 18% of the world's production). Consequently, there is a large quantity of waste. The idea is to create a 100% recyclable vegan leather through a wine waste valorization process.	Partnerships with distilleries on the national territory and collaborations with the University of Florence and other specialized research centers in order to analyze the characteristics of different plant fibers that could be transformed into eco-sustainable materials.

from local agro-industrial companies which, in turn, by supplying these wastes, reduce disposal costs. In Biova, the production process involves local wood-fired ovens, which deliver the unsold bread; Frumat purchases most of the raw material from industries in the area that produce juices, reducing their costs of disposal and enhancing the local economic system. Lavandula collaborates with a local agricultural company, Raimo, from which it obtains the waste from the production of artichokes. Oltrecafè collaborates with local actors in the coffee harvesting process. In Orange Fiber, the first part of the transformation takes place in Sicily where the cellulose is extracted from the citrus fruit waste, resulting from the processing of local companies to produce juices. RiceHouse purchases byproducts from local rice fields and mixes them in plaster, lime and screed mixtures to obtain building products. Then, the production systems of circular firms blend the supply chains of businesses, based on the reuse and recycling of waste to produce secondary raw materials completely naturally, safely, and sustainably. They are used in creating sustainable products and achieving better environmental performance of the product processes for all supply chains involved.

In addition, the analysis notes the importance of the ecosystem perspectives on circular-oriented innovation. The interviewees describe the importance of social ties in the development of innovative ideas, through the links created with local and national research centers, like universities, in order to support the implementation of circular ideas/projects and the development of continuous innovation. Lavandula, for example, collaborates with the University of Salerno to carry out the research, analysis, and tests necessary for cosmetics products. Packtin is a spin-off of the University of Modena and Reggio Emilia; in its laboratories began research on agri-food technologies and biodegradable plastics for food packaging. Vegea has used the expertise of the University of Florence and other specialized research centers to analyze the characteristics of several plant fibers that could be transformed into eco-sustainable

materials. Orange Fiber had a feasibility study conducted by the Materials Chemistry Laboratory of the Politecnico di Milano.

Finally, the research notes that strong ties to the local system seem to produce benefits in terms of environmental, economic, and social performance (Table 4). The founders interviewed illustrate the benefits, for industrial actors, that are measurable in the form of a reduction in disposal costs and an improvement in the performance of industrial processes. The enhancement of local resources and opportunities to differentiate local products from competitors are other advantages that improve local system economic performance.

For the community, the benefits are described in environmental impacts too, for example, in better air quality (reducing the emissions resulting from the combustion of waste) and a reduction in the risks of soil pollution. Additionally, the enhancement of local culture, an increase in the quality of life, and the attractiveness of the territory can be considered social benefits arising from the development of circular practices in industrial processes. These positive impacts are witnessed by different firms (Biova, Biofaber, The Circle, Frumat, Save the Waste) and are shown in some sentences (from secondary data):

> *"We wanted to create a profit company capable of leaving something positive on the territory. We have organized the collection and transformation of the bread at zero km, to limit the environmental impact" (Biova, from web-site);*

> *"The reuse of waste represents, on the one hand, the starting point for BioFaber to feed bacterial cultures, [and] on the other, an economic advantage linked to the disposal costs for the companies that produce them and an environmental benefit, since emissions are avoided related to their combustion" (BioFaber, from specialized press);*

> *"The company aims to maintain a close relationship with the local area and purchases most of the raw material from industries in the area that produce juices. These industries, instead of incurring a disposal cost, supply Frumat which, in this way, in addition to sustainability, enhances the resources and the local economic context" (Frumat, from specialized press).*

Discussions: Understanding experiences to support circular innovation

What do the case studies teach us about circular entrepreneurship? This study reveals that circular founders engage areas of expertise in shareholder structure and local stakeholders in developing eco-innovations. They often combine internal knowledge with external knowledge, especially in a start-up phase, experimenting with the feasibility of the idea. They create value for their enterprises, for the other economic

actors (directly or indirectly involved in the firm's activities), and for the community. The advantages of circular innovation have been individuated, for circular founders, in the realizing of their idea of circular practice and in its industrial development, and for suppliers (in the cases investigated) in more efficient industrial waste disposal. At the same time, this study reveals that local systems and entire communities have the opportunity to use sustainable products, thereby reaping the benefits of the success of circular economy projects at economic, environmental, and social levels.

Therefore, from the research results, it emerges that what strongly describes circular entrepreneurship are the factors of the contamination of knowledge, the search for external knowledge and for partnerships to develop innovation and the interaction among entrepreneur and other contextual elements. Form this, upon closer inspection, seems to derive the joint importance of three theoretical approaches useful for outlining the salient characteristics of circular entrepreneurs' experiences: cross-fertilization of founders' expertise, an open innovation approach for the development of the innovation processes, and social capital for the strategic importance of links to the local system. Interpretation of circular entrepreneurship characteristics through these approaches allows to identify needed interventions to stimulate and encourage circular economy system implementation.

Cross-fertilization

This research reveals that the exposure of different expertise and skills produces the fertilizer necessary for the creation of a completely new technological domain and, of products that represent radical innovations.

In the cases investigated, exposure is strong among founders' competencies and skills. This finding might be linked to the concept of cross-fertilization (Enkel & Gassmann, 2010) across knowledge areas, which has been shown to be a valuable strategy for increasing the value of the outputs of the innovation processes (Kaplan & Vakili, 2015; Rosenkopf & Nerkar, 2001). It might recall the importance of the interdisciplinarity considered in the literature as a driver of innovation that can facilitate the transfer of individual knowledge at the organizational level too (Schaltegger et al., 2013). In fact, individuals' human capital, if shared to enable them to network personal knowledge with colleagues, can positively affect innovation within the firm (Subramaniam & Youndt, 2005).

Additionally, this research highlights development of industrial partners' types of knowledge. Cross-fertilization within inter-organizational collaboration processes is a key strategy supporting the transition toward the circular economy (Bagherzadeh et al., 2021; Greco et al., 2019) and contributing to the co-creation of an ecosystem shared value, as literature outlines (Baldassarre et al., 2019; Domenech et al., 2019; European Commission, 2015; Lüdeke-Freund et al., 2019; Pera et al., 2016).

Looking forward, the individual characteristics of circular entrepreneurs appears to be a salient aspect in the investigated circular firms. It is the integration of expertise and the sharing of knowledge among founders and with their industrial partners, that fuels innovation and makes it viable. Therefore, it can be considered an enabling factor of circular entrepreneurship.

This leads us to reflect on the implications that can emerge from this result, especially with reference to the institutional level. Facilitating the meeting between knowledge, supporting entrepreneurial training, with reference to the importance of knowledge sharing, could represent an efficacy policy to support the diffusion of the circular economy. Concretely, it is necessary to define institutional policies aimed at training, identifying actions, objectives and measures to ensure an effective education towards a circular entrepreneurship.

The circular economy requires a paradigm shift that makes the training and education system essential. At the same time, to support the birth of circular entrepreneurship, supporting policies could be identified through incentives and adequate financial instruments, that in some way reward knowledge sharing and circular innovation.

Open innovation

Circular entrepreneurs prefer an open orientation to innovation, which also includes the construction of open processes as explained by the open innovation theory: "*The use of purposive inflows and outflows of knowledge to accelerate internal innovation*, *and to expand the markets for external use of innovation*, *respectively*" (Chesbrough et al., 2006, p. 1). This seems to characterize circular promoters' behaviors. They have links to university and research centers in order to support knowledge-sharing and continuous innovation of circular practices.

As observed in this research, sourcing external knowledge increases opportunities for the cross-fertilization and recombination of internal and external knowledge (Fleming, 2001; Enkel et al., 2009). By completing internal knowledge bases, as illustrated in several studies (Arora & Gambardella, 2010; Kaplan & Vakili, 2015; Brown et al., 2021), circular firms increase the impact and value of innovative process outcomes, developing better products or services.

The innovation that the CE requires can be complicated to develop and implement within the boundaries of a single company; hence, in such scenarios innovation is at risk of being a fragmented phenomenon. The openness to innovation, as this research shows, can build complementary capabilities and abilities, accelerating knowledge exchange and making it possible to materialize innovation into products that can be commercialized.

This result leads us to reflect on some managerial implications. Although the companies investigated do not explicitly refer to the use of digital platforms, it is clear that knowledge sharing, seen as crucial in circular innovation, nowadays takes place mostly online. Therefore, it is believed that digital competences and knowledge of the virtual world represent skills that can no longer be ignored by companies.

Digital platforms in the circular economy make it possible to respond in real time to the request for the availability of knowledge and resources and, with reference to the market of products and secondary raw materials, allow information on their composition and conditions to be obtained.

Knowing the potential of the virtual network and knowing how to use it represents an important challenge for circular companies. It is not limited to the exchange of knowledge. In fact the use of smart technologies, such as artificial intelligence and smart sensors, enables predictive product maintenance as well as advanced diagnos-

tics and forecasting of components and products, thus increasing the reliability and availability of the products and helping companies to provide technical support and other services, such as repair and management of spare parts. But companies have to invest in new skills and adequate professional figures.

Social capital

The entrepreneurs examined have strong ties to their local systems, which supports the implementation of circular innovation and firms' activities. The identity of the area to which founders belong often represents the source of the circular idea. In many cases, the characteristics of the area, including its productive traditions, offer the entrepreneur the idea, while the presence of local actors with whom to collaborate enables the creation of the circular enterprise.

This finding might be linked to the concept of social capital, referred to as "connections among individuals to social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2001, p. 19), which, for start-ups and small businesses represents a strategic asset. Historically, the debate has discussed the "quality" of the socio-cultural context as a priority factor that can produce various degrees of competitiveness, as an area for the production of specific knowledge (contextual knowledge), and with a mechanism of social interactions (interpersonal relationship networks) (Garofoli, 1991) that support firms' innovation capability, including sustainable paths.

Geographic proximity has been considered an important driver of the development of sustainable practices (Del Baldo, 2009; De Chiara, 2016; Moggi et al., 2022), as the industrial symbiosis approach recently states in supporting circular practices. The debate on the entrepreneurial ecosystem underlines the capacity of a community and its culture to create a system of actors and infrastructures supporting the creation and growth of innovative business projects (Iacobucci & Perugini, 2021): mechanisms, institutions, networks, and cultures can support entrepreneurs (Malecki, 2018; Spigel & Harrison, 2018; Bastian & Zucchella, 2022; Wurth et al., 2022).

In addition, historically, the literature has underlined the importance of informal ties based on friendship (Vuorinen & Kurki, 2012). Trust, together with moral and ethical behavior, are considered factors of success that enable fruitful cooperation (Doepfer et al., 2016).

In this research, the entrepreneurs' experiences suggest that all these aspects are crucial to supporting the entrepreneurial initiative and the implementation of circular practices. Additionally, this study seems to reveal that, in a virtuous circle, the "quality" of a territory supports entrepreneurship, while the interaction among entrepreneurs and other contextual elements creates the conditions for circular start-ups. These conditions, in turn, contribute to new supply chains and job creation, thus fueling regional economic development, as underlined in the literature (Iacobucci & Perugini, 2021; Stam & Spigel, 2018). It is therefore believed that the relationship between the identity of a territory and the circular economy should be further investigated, as it can offer useful indications to policymakers. The debate has also underlined the strategic importance of identifying those aspects of the entrepreneurial

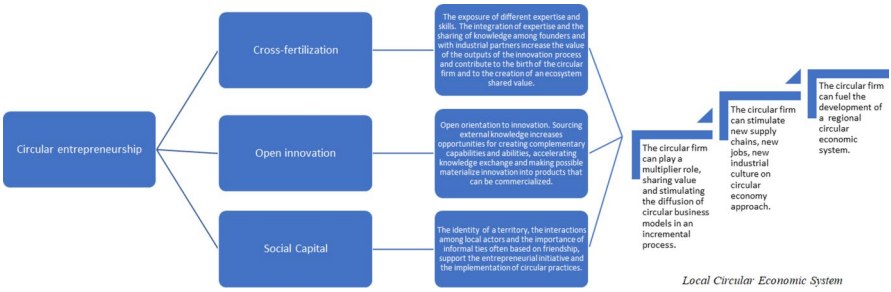

Fig. 4 Theoretical perspectives in circular entrepreneurship and development of a local circular economic system

ecosystem that play a major role in the growth and resilience of territories (Iacobucci & Perugini, 2021).

Upon closer inspection, this study suggests that the development of entrepreneurship embracing the principles of the circular economy could have far broader effects, transcending the benefits produced by a single firm. In fact, one circular firm could play a multiplier role in the development of a circular approach in suppliers' activities and for other economic actors that directly and indirectly have contacts with the circular firm. The birth of a circular firm seems to act as an attractor of suppliers, other business partners, or users who are involved in industrial processes, setting circular practices in their processes and, thus, fueling the diffusion of the circular economy business models in an incremental process.

Circular entrepreneur could be considered motivator for other actors (Rok & Kulik, 2020), and stimulating the spread of circular practices, he/she is aware of the necessity of sharing a value orientation to foster successful innovation. As Doepfer et al.'s research (2016) asserts, a certain share of values between the public and private actors is a necessary precondition for regional development and social performance in a collaborative approach.

The resulting implications are essentially institutional. Supporting collaboration, through the organizational models of the business network, appears to be a policy consistent with circularity practices. These models could also be encouraged with the introduction of tax breaks in favor of companies that join network contracts for the start of circular economy processes, or that operate through aggregate forms to trigger the necessary synergies for the development of circular entrepreneurship.

Figure 4 summarizes the theoretical perspectives that, according with the findings, explain the circular entrepreneurship.

Implications and conclusions

The transition to the circular economy shifts attention to re-using, fixing, renovating, and recycling existing materials and products. What was normally considered "waste" can become a resource. This is a result of the involvement of several types of knowledge; almost by definition, the circular economy implies the engagement of

several knowledge types (Ellen MacArthur Foundation, 2015; European Commission, 2015; Potting et al., 2017).

This study asserts that comprehensive knowledge of circular entrepreneurship is needed to stimulate and foster the implementation of the circular economy system. To date, academics have focused on two areas separately. First, they have investigated circular business models, innovation, and the relationship between the waste producer and the waste user. Second, the debate over entrepreneurship has focused on drivers of the formation of new enterprises and has involved little research into circular ones. This study sought to join these two perspectives.

Theoretical and other policy implications

This research's findings are coherent with the debate on individual characteristics of circular entrepreneurs, but it delves into some issues in depth.

First, in this research the role of the integration of expertise and the sharing of knowledge as enabling factors of circular entrepreneurship emerges very strongly. The combination of skills, among its founders, fuels the circular innovation and makes it viable. In the debate, as in the industrial symbiosis approach, interdisciplinarity has been studied in terms of inter-collaboration among firms, and is considered strategic in implementing the circular economy (Baldassarre et al., 2019; Chertow, 2000). As underlined in other research, interdisciplinary activity can also facilitate the transfer of individual knowledge at the organizational level (Schaltegger et al., 2013). In this case, the value of multidisciplinary activity is recognized as fundamental for the passage from individual knowledge to the assimilation, transformation, and exploitation of knowledge at the organizational level (Sun & Anderson, 2008), where, the understanding of these relationships allows for the management of their development over time.

In this research the cross-fertilization, which involves founders' skills, emerges as a preparatory factor for circular innovation and the birth of a company. Therefore, the in-depth analysis of this relation represents an interesting area of research on circular entrepreneurship, because it can also lead policies that support entrepreneurial training with reference to the importance of knowledge sharing.

The value of external knowledge acquisition is another aspect emerging from this study that can be linked to the assumptions of the open innovation approach. This research shows that founders' knowledge is enriched through experience with other research partners (*outside-in process)*, and the engagement with complementary partners represents a key factor of success for circular practices (*coupled process*) (Enkel et al., 2009). This research illustrates that open innovation is essential for the start-up phase in many circular enterprises and that the links to the research entities ensure continuous innovation improvement.

The importance attributed by some entrepreneurs interviewed to the external acquisition of knowledge recalls the line of research on the individual characteristics of circular entrepreneurs with regard to their ability to form external relationships that support circular innovation (Aaboen et al., 2017; Pagano et al., 2018) or to integrate ecosystem perspectives into circular-oriented innovation (Bagherzadeh et al., 2021; Branca et al., 2020; Eisenreich et al., 2021; Greco et al., 2019; Konietzko

et al., 2020). The collaboration ability, as asserted in other research lines, recalls also the firm's capacity to explore external knowledge which should depend on its internal innovation capacity (absorptive capacity) (Radicic & Pinto, 2019). This approach suggests considering absorptive capacity in relation to the external sources from which company will seek to absorb knowledge, including networking and collaboration activities. Therefore, the ability of circular entrepreneurs to form external relationships that support circular innovation and the capacity of the circular firm, through its competences, to explore external knowledge, represent enabling factors of circular entrepreneurship and identify lines of research which are relevant for the diffusion of circular entrepreneurship.

A further topic that the debate should investigate is the necessity of adequate skills of the entrepreneur or company to consult the knowledge market and to use the appropriate digital technologies. The strong and—in some cases radical—innovation that we have seen, characterized the companies interviewed, highlights the importance of in depth-studies on ability to explore external knowledge, and for the resulting policy suggestions. As the literature underlines, institutional support appears relevant in presence of start-ups' and SMEs' innovation processes, as these actors seem to find more difficulties in interfacing with research partners (such as universities) (Caloffi et al., 2015; Brown et al., 2020). It also appears relevant in supporting collaborative networks of local firms, considered the key components of innovation (De Noni et al., 2018), then institutional policy could have an essential role in supporting the training of specific skills consulting the knowledge market.

Another factor is territoriality, which can be explained as the individuation of opportunity in the same area to which the founders belong and the consequent links that they build with other local economic actors. In accordance with institutional and theoretical assumptions, this research confirms the importance of proximity as an important driver of innovation. First, the territory is often the source of circular idea, and the presence of local actors make the implementation of circular practices possible, also triggering a virtuous circle on the reconversion of the local economy. OECD, for example, asserts that proximity can have significant positive effects on the rates of formation of new businesses, on productivity, on innovation, on profitability, and on the growth of businesses itself (Davis et al., 2016). The debate over the importance of physical proximity as a driver for the dissemination of knowledge is very structured, through the consolidation of absorptive capacity (Cohen & Levinthal, 1990), and is extensively investigated by district theory.

This research confirms the role of the local system as a counterpart where the entrepreneur acquires values and goals shaping his/her action (Doepfer et al., 2016), and as a functional support network able to provide economic and socially related resources and to support the creation and growth of innovative business projects (Iacobucci & Perugini, 2021). The circular firms investigated are often imbued with the values and traditions of the area to which they belong; they are also influenced by the specific resources of their places which end up directing the circular entrepreneur in choosing the activity to carry out. The history of places and the specificities of the resources can be a source of information that can address the green reconversion of the local economy, and appear as an interesting line of research on the formation of new circular firms.

Finally, this research illustrates the impact of the circular economy. As the debate has illustrated, the circular economy contributes to the reduction in the amount of waste discharged (from the waste producer perspective), the primary inputs (raw materials, energy, water) used in production processes (from the waste user perspective), and greenhouse gas emissions (Jacobsen, 2006; Kim et al., 2018). The findings of this research confirm that circular entrepreneurship can help to create environmental benefits for society, but they also outline that important social benefits can be obtained, contributing to the study on the social impact of the circular economy, which is scarcely investigated in the literature (Murray et al., 2017). This paper proposes a reflection on the possibility of circular firms, first, to enhance local cultures, promoting an economic development characterized by local-specific resources and supported by collaboration among local actors, and by building new supply chains for implementing circular practices.

Secondly, this research illustrates how a circular firm can have a multiplier role in the development of a circular approach, stimulating a circularity culture that can feed the spread of new industrial ventures and create social benefits in terms of new jobs or the growth of businesses, thus improving the quality of social context.

A further in-depth study of the social effects of circular entrepreneurship may be interesting, as highlighted in the literature, in order to build circular and inclusive societies that contribute to the achievement of the SDGs (Schröder et al., 2020). Likewise, it may be interesting to delve deeper into studies on circular entrepreneurship from the perspective of social entrepreneurship (Candi et al., 2019). This research has highlighted that the founders were very often moved by the observation of an environmental problem in their territory and, as has been said, the idea of circular innovation was born precisely from the territory; the desire to respond to an environmental and social challenge is an integral part of innovation. But this research does not investigate on the weight that the objective of contributing to solving an environmental and social challenge has compared to an economic objective, therefore deepening the studies on circular entrepreneurship's roles in the perspective of social entrepreneurship, in achieving corporate objectives and in response to the needs of society, all of which appear to be a further line of studies to be developed.

Finally, although this paper has the typical limitations of case study research regarding statistical generalizability, it suggests, as already discussed in precedent paragraph, some policy implications about specific actions that can be implemented to enrich the enabling factors of circular entrepreneurship, and some more general policy implications that can support the transformation toward a circular economy. As outlined in the literature, institutions have an important role in "…developing new policies and implementing new technologies and innovative sustainable models that make the transition to a circular economy" (Manea et al., 2021, p. 1354), and in supporting entrepreneurs in introducing the circular approach and practices in setting their vision and priorities for a better future (UNIDO, 2019).

Promoting this approach requires broad political support at the national, regional, and local levels, but also at the international level, as supply chains extend on a global scale.

At a local level, institutions should act with strategies that strengthen the relational structure in order to enrich local resources and promote local development that

pays attention to the needs and potentialities that the local area presents, promoting a development characterized by local specific resources. A policy should start from an in-depth knowledge of human, historical and natural resources present in the area, in order to enhance them (De Chiara, 2016).

Local policies should create a fruitful area where relationships among its actors are possible and supported. The promotion of territorial partnerships must include public-private collaborations.

At a macro-regional level, policies are essential for achieving regional coordination, promoting industrial symbiosis, awareness-raising, and the exchange of knowledge and best practices. Through cooperation among territories and the promotion of territorial partnerships, it is possible to engage with nearby areas and spread sustainable practices.

At the national and international levels, as underlined by the European Policy of Recovery Fund and the Green Deal, policies should act in the construction of a framework to facilitate the circular economy, combining regulation, research, and innovation incentives. In Italy, for example, starting from the recent institutionalization of the Minister of the Ecological Transaction, policies should support the reconversion of production and consumption models, choosing appropriate industrial development plans tailored to the specifics of each Italian region. As highlighted in the literature, the innovation policy can adopt a regional innovation systems approach (Lau & Lo, 2015) in which governments, through combinations of policies such as education and training, knowledge-intensive supporting services, and value chains, bear both innovation and entrepreneurship to foster growth and sustainability (Galbraith et al., 2017).

A recent study by Beynon, Jones, and Pickernell (2023) emphasizes that policymakers should consider groups of regions in the European context that face similar conditions in order to identify solutions that can apply to certain groups of regions. This approach should allow policymakers to identify whether policies need to be broader, considering the mix of conditions important to explaining and supporting firms' innovation.

Certainly, the path is not easy. However, this paper attempts to create better knowledge about circular entrepreneurship and foster greater awareness of the factors that enable the birth of these businesses, so that possible theoretical, practical and institutional implications can be identified.

Limitations and suggestions for further research

This study was based on a limited qualitative sample of eleven entrepreneurs and the results reflect the experiences of the interviewed entrepreneurs in the specific context of Italy, which limits the generalizability of the results. Thus, larger qualitative studies are needed to confirm whether the patterns observed in this study are consistent across different countries. Furthermore, the lines of research emerging from this work will need to be explored in depth. In detail, the cross-fertilization, which involves founders' skills; the ability to explore external knowledge; the specificities of territo-

rial resources to direct the formation of new circular businesses and the perspective of social entrepreneurship for circular entrepreneurship.

Funding No funds, grants, or other support was received.

Declarations

The authors have no financial or proprietary interests in any material discussed in this article.

References

Aaboen, L., Rocca, A. L., Lind, F., Perna, A., & Shih, T. (2017). *Introduction: Starting up in Business Networks—Why relationships matter in entrepreneurship. Starting Up in Business Networks: Why Relationships Matter in Entrepreneurship*, Università Cattolica del Sacro Cuore Milano. Retrieved from https://publires.unicatt.it/en/publications/introduction-starting-up-in-business-networks-why-relationships-mQ6

Abbate, S., Centobelli, P., Cerchione, R., Giardino, G., & Passaro, R. (2023). Coming out the egg: Assessing the benefits of circular economy strategies in agri-food industry. *Journal of Cleaner Production*, *385*, 135665. https://doi.org/10.1016/j.jclepro.2022.135665

Affolderbach, J., & Krueger, R. (2017). Just ecopreneurs: re-conceptualising green transitions and entrepreneurship. *Local Environment*, *22*(4), 410–423. https://doi.org/10.1080/13549839.2016.1210591

Annosi, M. C., Brunetta, F., Bimbo, F., & Kostoula, M. (2021). Digitalization within food supply chains to prevent food waste. Drivers, barriers and collaboration practices. *Industrial Marketing Management*, *93*, 208–220. https://doi.org/10.1016/j.indmarman.2021.01.005

Arora, A., & Gambardella, A. (2010). The market for technology. *Handbook of the Economics of Innovation*, *1*, 641–678. https://doi.org/10.1016/S0169-7218(10)01015-4

Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: Same, different, or both?? *Entrepreneurship Theory and Practice*, *30*(1), 1–22. https://doi.org/10.1590/S0080-21072012000300003

Bagherzadeh, M., Markovic, S., & Bogers, M. (2021). Managing open innovation: A Project-Level perspective. *IEEE Transactions on Engineering Management*, *68*(1), 301–316. https://doi.org/10.1109/TEM.2019.2949714

Bailey, D., Glasmeier, A., Tomlinson, P. R., & Tyler, P. (2019). Industrial policy: New technologies and transformative innovation policies? *Cambridge Journal of Regions Economy and Society*, *12*(2), 169–177. https://doi.org/10.1093/cjres/rsz006

Baldassarre, B., Schepers, M., Bocken, N., Cuppen, E., Korevaar, G., & Calabretta, G. (2019). Industrial symbiosis: Towards a design process for eco-industrial clusters by integrating circular economy and industrial ecology perspectives. *Journal of Cleaner Production*, *216*, 446–460. https://doi.org/10.1016/j.jclepro.2019.01.091

Banik, B. J. (1993). Applying triangulation in nursing research. *Applied Nursing Research*, *6*(1), 47–52. https://doi.org/10.1016/S0897-1897(05)80042-4

Bastian, B., & Zucchella, A. (2022). Entrepreneurial metacognition: A study on nascent entrepreneurs. *International Entrepreneurship and Management Journal*, *18*, 1775–1805. https://doi.org/10.1007/s11365-022-00799-1

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544–559. https://doi.org/10.46743/2160-3715/2008.1573

Beynon, M. J., Jones, P., & Pickernell, D. (2023). Evaluating EU-Region level innovation readiness: A longitudinal analysis using principal component analysis and a constellation graph index approach. *Journal of Business Research*, *159*(6), 113703. https://doi.org/10.1016/j.jbusres.2023.113703

Bocken, N. M., De Pauw, I., Bakker, C., & Van Der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, *33*(5), 308–320. https://doi.org/10.1080/21681015.2016.1172124

Boulding, K. (1966). The economics of the coming spaceship Earth. In H. Jarrett (Ed.), *Environmental quality in a growing economy, resources for the future* (pp. 3–14). Johns Hopkins University.

Bowen, R., Dowell, D., & Morris, W. (2024). Hospitality SMEs and the circular economy: Strategies and practice post-COVID. *British Food Journal*, *126*(1), 80–97. https://doi.org/10.1108/BFJ-10-2022-0932

Branca, T. A., Colla, V., Algermissen, D., Granbom, H., Martini, U., Morillon, A., & Rosendahl, S. (2020). Reuse and recycling of by-products in the steel sector: Recent achievements paving the way to circular economy and industrial symbiosis in Europe. *Metals*, *10*(3), 345. https://doi.org/10.3390/met10030345

Brown, M. T., & Ulgiati, S. (2011). Understanding the global economic crisis: A biophysical perspective. *Ecological Modelling*, *223*(1), 4–13. https://doi.org/10.1016/j.ecolmodel.2011.05.019

Brown, P., Bocken, N., & Balkenende, R. (2020). How do companies collaborate for circular oriented innovation? *Sustainability*, *12*(4), 1648. https://doi.org/10.3390/su12041648

Brown, P., Baldassarre, B., Konietzko, J., Bocken, N., & Balkenende, R. (2021). A tool for collaborative circular proposition design. *Journal of Cleaner Production*, *297*, 126354. https://doi.org/10.1016/j.jclepro.2021.126354

Caloffi, A., Rossi, F., & Russo, M. (2015). What makes SMEs more likely to collaborate? Analysing the role of regional innovation policy. *European Planning Studies*, *23*(7), 1245–1264. https://doi.org/10.1080/09654313.2014.919250

Candi, M., Melia, M., & Colurcio, M. (2019). Two birds with one stone: The quest for addressing both business goals and social needs with innovation. *Journal of Business Ethics*, *160*(4), 1019–1033.

Chertow, M. R. (2000). Industrial symbiosis: Literature and taxonomy. *Annual Review of Energy and the Environment*, *25*(1), 313–337. https://doi.org/10.1146/annurev.energy.25.1.313

Chesbrough, H., Vanhaverbeke, W., & West, J. (2006). *Open innovation: Researching a new paradigm*. Oxford University Press.

Circular Economy Network. (2023). 5° Rapporto sull'Economia Circolare in Italia – 2023. Retrieved from: https://circulareconomynetwork.it/wp-content/uploads/2023/05/Rapporto-sulleconomia-circolare-in-Italia-2023-2.pdf. Accessed 20 Jan 2024.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*, 128–152. https://doi.org/10.2307/2393553

Colucci, M., & Vecchi, A. (2021). Close the loop: Evidence on the implementation of the circular economy from the Italian fashion industry. *Business Strategy and the Environment*, *30*(2), 856–873. https://doi.org/10.1002/bse.2658

Dantas, R. M., Ilyas, A., Martins, J. M., & Rita, J. X. (2022). Circular entrepreneurship in emerging markets through the lens of sustainability. *Journal of Open Innovation: Technology Market and Complexity*, *8*(4), 211. https://doi.org/10.3390/joitmc8040211

Davis, C., Arthurs, D., Cassidy, E., E., & Wolfe, D. (2016). *What Indicators for Cluster Policies in the 21st Century*? OECD. Retrieved May 16, 2022 from www.oecd.org/dataoecd/22/18/37443546.pdf

De Chiara, A. (2016). *Implementing sustainability strategies in networks and Clusters– Principles, tools and new research outcomes*. Springer.

De Jong, E., Engelaer, F., & Mendoza, M. (2015). *Realizing opportunities of a circular business model. DLL*. Retrieved March 10, 2023, *from*https://www.dllgroup.com/en/resources/~/media/Project/Dll/Global/Documents/Whitepapers%20and%20reports/realizingopportunitiesofacircularbusinessmodelEN012RGB.pdf

De Noni, I., Orsi, L., & Belussi, F. (2018). The role of collaborative networks in supporting the innovation performances of lagging-behind European regions. *Research Policy*, *47*(1), 1–13. https://doi.org/10.1016/j.respol.2017.09.006

Del Baldo, M. (2009). Corporate social responsibility e corporate governance: Quale Nesso Nelle PMI? *Rivista Piccola Impresa/ Small Business*, *3*, 61–102. https://doi.org/10.14596/pisb.75

Del Vecchio, P., Urbinati, A., & Kirchherr, J. (2024). Enablers of managerial practices for circular business model design: An empirical investigation of An agro-energy company in a rural area. *IEEE Transactions on Engineering Management*, *71*, 873–887. https://doi.org/10.1109/TEM.2021.3138327

Demirel, P., & Danisman, G. O. (2019). Eco-innovation and firm growth in the circular economy: Evidence from European small-a Fnd medium-sized enterprises. *Business Strategy and the Environment*, *28*(8), 1608–1618. https://doi.org/10.1002/bse.2336

Doepfer, B. C., Habisch, A., Pechlaner, H., Poppe, X. I., & Schwarz, C. (2016). Entrepreneurship, shared values and the region-assessing the conditions for regional social performance of entrepreneurial behaviour. *International Journal of Innovation and Regional Development*, *7*(1), 36–56. https://doi.org/10.1504/IJIRD.2016.076201

Domenech, T., Bleischwitz, R., Doranova, A., Panayotopoulos, D., & Roman, L. (2019). Mapping industrial symbiosis development in Europe typologies of networks, characteristics, performance and contribution to the circular economy. *Resources Conservation & Recycling*, *141*, 76–98. https://doi.org/10.1016/j.resconrec.2018.09.016

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*(4), 532–550. https://doi.org/10.2307/258557

Eisenreich, A., Füller, J., & Stuchtey, M. (2021). Open circular innovation: How companies can develop circular innovations in collaboration with stakeholders. *Sustainability*, *13*(23), 13456. https://doi.org/10.3390/su132313456

Ellen MacArthur Foundation. (2015). Delivering the circular economy: A toolkit for policymakers. Cowes, UK: Ellen MacArthur Foundation. Retrieved from https://emf.thirdlight.com/file/24/neVTuDFno5ajUene-man5IbBE/Delivering%20the%20circular%20economy%3A%20a%20toolkit%20for%20policymakers.pdf. Accessed 8 June 2020.

Enkel, E., & Gassmann, O. (2010). Creative imitation: Exploring the case of Cross-Industry innovation. *R&D Management*, *40*(3), 256–270. https://doi.org/10.1111/j.1467-9310.2010.00591.x

Enkel, E., Gassmann, O., & Chesbrough, H. (2009). Open R&D and open innovation: Exploring the phenomenon. *R&D Management*, *39*(4), 311–316. https://doi.org/10.1111/j.1467-9310.2009.00570.x

European Commission. (2015). Closing the Loop - An Eu action Plan for the Circular Economy. Bruxelles: COM (2015) 614 final. Retrieved from https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF. Accessed 10 May 2020.

European Commission. (2020). A new Circular Economy Action Plan for a Cleaner and more Competitive Europe. Brussels: COM (2020), 98 final. Retrieved from https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0020.02/DOC_1&format=PDF. Accessed 16 May 2022.

Fleming, L. (2001). Recombinant uncertainty in technological search. *Management Science*, *47*, 117–132. https://doi.org/10.1287/mnsc.47.1.117.10671

Fletcher, M., Zhao, Y., Plakoyiannaki, E., & Buck, T. (2018). Three pathways to case selection in international business: A twenty–year review, analysis and synthesis. *International Business Review*, *27*(4), 755–766. https://doi.org/10.1016/j.ibusrev.2017.12.004

Galbraith, B., McAdam, R., Woods, J., J., & McGowan, T. (2017). Putting policy into practice: An exploratory study of SME innovation support in a peripheral UK region. *Entrepreneurship & Regional Development*, *29*(7–8), 668–691. https://doi.org/10.1080/08985626.2017.1325939

Garofoli, G. (1991). Modelli locali di sviluppo. Franco Angeli.

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular Economy–A new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, *114*, 11–32. https://doi.org/10.1016/j.jclepro.2015.09.007

Greco, M., Grimaldi, M., & Cricelli, L. (2019). Benefits and costs of open innovation: The BeCO framework. *Technology Analysis & Strategic Management*, *31*(1), 53–66. https://doi.org/10.1080/09537325.2018.1484442

Hettiarachchi, B. D., Brandenburg, M., & Seuring, S. (2022). Connecting additive manufacturing to circular economy implementation strategies: Links, contingencies and causal loops. *International Journal of Production Economics*, *246*, 108414. https://doi.org/10.1016/j.ijpe.2022.108414

Huynh, P. H. (2021). Enabling circular business models in The fashion industry: The role of digital innovation. *International Journal of Productivity and Performance Management*, *71*(3), 870–895. https://doi.org/10.1108/IJPPM-12-2020-0683

Iacobucci D, Perugini F (2021) Entrepreneurial ecosystems and economic resilience at local level. *Entrepreneurship & Regional Development*, 33(9–10), 689– 716. https://doi.org/10.1080/08985626.2021.1888318

Jack, E. P., & Raturi, A. S. (2006). Lessons learned from methodological triangulation in management research. *Management Research News*, *29*(6), 345–357. https://doi.org/10.1108/01409170610683833

Jacobsen, N. B. (2006). Industrial symbiosis in Kalundborg, Denmark: A quantitative assessment of economic and environmental aspects. *Journal of Industrial Ecology*, *10*(1-2), 239–255. https://doi.org/10.1162/108819806775545411

Jick, T. D. (1979). Mixing qualitative and quantitative research methods: Triangulation in action. *Administrative Sciences Quarterly*, *24*(4), 602–611. https://doi.org/10.2307/2392366

Kaplan, S., & Vakili, K. (2015). The double-edged sword of recombination in breakthrough innovation. *Strategic Management Journal*, *36*(10), 1435–1457. https://doi.org/10.1002/smj.2294

Kim, H. W., Ohnishi, S., Fujii, M., Fujita, T., & Park, H. S. (2018). Evaluation and allocation of greenhouse gas reductions in industrial symbiosis. *Journal of Industrial Ecology*, *22*(2), 275–287. https://doi.org/10.1111/jiec.12539

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Knickmeyer, D. (2020). Social factors influencing household waste separation: A literature review on good practices to improve the recycling performance of urban areas. *Journal of Cleaner Production*, *245*(1), 118605. https://doi.org/10.1016/j.jclepro.2019.118605

Konietzko, J., Bocken, N., & Hultink, E. J. (2020). Circular ecosystem innovation: An initial set of principles. *Journal of Cleaner Production*, *25*, 119942. https://doi.org/10.1016/j.jclepro.2019.119942

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular economy: The concept and its limitations. *Ecological Economics*, *143*, 37–46. https://doi.org/10.1016/j.ecolecon.2017.06.041

Košir, L., & Kuenkel, P. (2022). Collaborative transformations: Circular economy strategies in Europe. In P. Kuenkel, & K. V. Ragnarsdottir (Eds.), *Transformation literacy. Pathways to regenerative civilizations* (pp. 277–287). Springer International Publishing.

Kraus, S., Breier, M., Lim, W. M., Dabić, M., Kumar, S., Kanbach, D., & Ferreira, J. J. (2022). Literature reviews as independent studies: Guidelines for academic practice. *Review of Managerial Science*, *16*(8), 2577–2595. https://doi.org/10.1007/s11846-022-00588-8

Lacy, P., Rutqvist, J., & Lamonica, B. (2016). *Circular economy: Dallo spreco al valore*. EGEA.

Lans, T., Blok, V., & Wesselink, R. (2014). Learning apart and together: Towards an integrated competence framework for sustainable entrepreneurship in higher education. *Journal of Cleaner Production*, *62*, 37–47. https://doi.org/10.1016/j.jclepro.2013.03.036

Lau, A. K., & Lo, W. (2015). Regional innovation system, absorptive capacity and innovation performance: An empirical study. *Technological Forecasting and Social Change*, *92*, 99–114. https://doi.org/10.1016/j.techfore.2014.11.005

Lazarevic, D., & Brandão, M. (2020). The circular economy: A strategy to reconcile economic and environmental objectives? In M. Brandão, D. Lazarevic, & G. Finnveden (Eds.), *Handbook of the circular economy* (pp. 8–27). Edward Elgar Publishing.

Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: A comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, *115*, 36–51. https://doi.org/10.1016/j.jclepro.2015.12.042

Lüdeke-Freund, F., Gold, S., & Bocken, N. M. P. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, *23*(1), 36–61. https://doi.org/10.1111/jiec.12763

Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*, *12*(3), 12359. https://doi.org/10.1111/gec3.12359

Mancuso, S. (2021). *Law and food: Regulatory recipes of culinary issues*. Routledge.

Manea, D. I., Istudor, N., Dinu, V., & Paraschiv, D. M. (2021). Circular economy and innovative entrepreneurship, prerequisites for social progress. *Journal of Business Economics and Management*, *22*(5), 1342–1359. https://doi.org/10.3846/jbem.2021.15547

Martínez-Pérez, Á., Elche, D., & García-Villaverde, P. M. (2019). From diversity of interorganizational relationships to radical innovation in tourism destinations: The role of knowledge exploration. *Journal of Destination Marketing & Management*, *11*, 80–88. https://doi.org/10.1016/j.jdmm.2018.12.002

Massetti, B. L. (2008). The social entrepreneurship matrix as a tipping point for economic change. *Emergence: Complexity and Organization*, *10*(3), 1–8.

Meyer, C. B. (2001). A case in case study methodology. *Field Methods*, *13*(4), 329–352. https://doi.org/10.1177/1525822X0101300402

Miedziński, M. (2018). Do policy makers tell good stories? Towards a multi-layered framework for mapping and analysing policy narratives embracing futures. *Futures*, *101*, 10–25. https://doi.org/10.1016/j.futures.2018.05.003

Mies, A., & Gold, S. (2021). Mapping the social dimension of the circular economy. *Journal of Cleaner Production*, *321*, 128960. https://doi.org/10.1016/j.jclepro.2021.128960

Miles, M. B., & Hubermann, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage Productions.

Ministero della Transizione Ecologica. (2020). Programma nazionale per la gestione dei rifiuti. Retrieved from: https://www.cisl.it/wp-content/uploads/2022/07/Programma_naz_pestione_rifiuti.pdf. Accessed 12 Sept 2023.

Ministero della Transizione Ecologica. (2022). Strategia nazionale per l'economia circolare. Retrieved from: https://www.mase.gov.it/sites/default/files/archivio/allegati/PNRR/SEC_21.06.22.pdf. Accessed 12 Sept 2023.

Moggi, S., Pierce, P., & Bernardi, N. (2022). From sustainability to thrivability: A novel framework for entrepreneurial ecosystems. *International Entrepreneurship and Management Journal*, *18*, 829–853. https://doi.org/10.1007/s11365-021-00787-x

Mont, O., Plepys, A., Whalen, K., K., & Nußholz, J. L. K. (2017). *Business model innovation for a Circular Economy: Drivers and barriers for the Swedish industry– the voice of REES companies.* Mistra REES. Retrieved January, 9, 2021 from https://lucris.lub.lu.se/ws/portalfiles/portal/33914256/MISTRA_REES_Drivers_and_Barriers_Lund

Monteverde, G., & Runfola, A. (2024). Add a seat for another actor in the business network! Consumer communities' roles for fashion sustainable new ventures. *Journal of Business & Industrial Marketing*, *39*(7), 1567–1581. https://doi.org/10.1108/JBIM-08-2023-0440

Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, *140*, 369–380. https://doi.org/10.1007/s10551-015-2693-2

Neri, A., Negri, M., Cagno, E., Kumar, V., & Garza-Reyes, J. A. (2023). What digital-enabled dynamic capabilities support the circular economy? A multiple case study approach. *Business Strategy and the Environment*, *32*(7), 5083–5101. https://doi.org/10.1002/bse.3409

Newman, A., Obschonka, M., Moeller, J., & Chandan, G. G. (2021). Entrepreneurial passion: A review, synthesis, and agenda for future research. *Applied Psychology*, *70*(2), 816–860. https://doi.org/10.1111/apps.12236

Observatory Circular Economy. *Circular Economy Report* (2024). Retrieved December 20, 2024, from https://www.energystrategy.it/es-download/

Padilla-Rivera, A., Russo-Garrido, S., & Merveille, N. (2020). Addressing the social aspects of a circular economy: A systematic literature review. *Sustainability*, *12*(19), 7912. https://doi.org/10.3390/su12197912

Pagano, A., Petrucci, F., & Bocconcelli, R. (2018). A business network perspective on unconventional entrepreneurship: A case from the cultural sector. *Journal of Business Research*, *92*, 455–464. https://doi.org/10.1016/j.jbusres.2018.07.012

Palombi, G., Schiaroli, V., Fraccascia, L., & Nonino, F. (2024). Identifying barriers and good practices for implementing circular economy principles in small and medium enterprises. *Business Strategy and the Environment*, *33*(7), 6773–6794. https://doi.org/10.1002/bse.3835

Patton, M. Q. (2002). *Qualitative research & evaluation methods*. Sage.

Pera, R., Occhiocupo, N., & Clarke, J. (2016). Motives and resources for value co-creation in a multi-stakeholder ecosystem: A managerial perspective. *Journal of Business Research*, *69*(10), 4033–4041. https://doi.org/10.1016/j.jbusres.2016.03.047

Porto Gómez, I., Otegi Olaso, J. R., & Zabala-Iturriagagoitia, J. M. (2016). Rosa, Rosae, Rosis: Modelling a regional open sectoral innovation system. *Entrepreneurship & Regional Development*, *2*(1–2), 26–50. https://doi.org/10.1080/08985626.2015.1095946

Potting, J., Hekkert, M. P., Worrell, E., & Hanemaaijer, A. (2017). *Circular economy: measuring innovation in the product chain*. PBL Netherlands Environmental Assessment Agency. Retrieved Juanary 10, 2021, from https://www.file:///Users/alessandradechiara/Downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544%20(1).pdf

Putnam, R. (2001). *Bowling alone: The collapse and revival of American community*. Simon & Shuster.

Radicic, D., & Pinto, J. (2019). Collaboration with external organizations and technological innovations: Evidence from Spanish manufacturing firms. *Sustainability*, *11*(9), 2479. https://doi.org/10.3390/su11092479

Ranta, V., Aarikka-Stenroos, L., & Väisänen, J. M. (2021). Digital technologies catalyzing business model innovation for circular economy—Multiple case study. *Resources Conservation and Recycling*, *164*, 105155. https://doi.org/10.1016/j.resconrec.2020.105155

Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., et al. (2016). Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers. *Sustainability*, *8*(11), 1212. https://doi.org/10.3390/su8111212

Rok, B., & Kulik, M. (2020). Circular start-up development: The case of positive impact entrepreneurship in Poland. *Corporate Governance: the International Journal of Business in Society*, *21*(2), 339–358. https://doi.org/10.1108/CG-01-2020-0043

Rosenkopf, L., & Nerkar, A. (2001). Beyond local search: Boundary- spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, *22*(4), 287–306. https://doi.org/10.1002/smj.160

Rovanto, I. K., & Bask, A. (2021). Systemic circular business model application at the company, supply chain and society levels—A view into circular economy native and adopter companies. *Business Strategy and the Environment*, *30*(2), 1153–1173. https://doi.org/10.1002/bse.2677

Santos, F. M. (2012). A positive theory of social entrepreneurship. *Journal of Business Ethics*, *111*(3), 335–351. https://doi.org/10.1007/s10551-012-1413-4

Sawe, F. B., Kumar, A., Garza-Reyes, J. A., & Agrawal, R. (2021). Assessing people-driven factors for circular economy practices in small and medium-sized enterprise supply chains: Business strategies and environmental perspectives. *Business Strategy and the Environment*, *30*(7), 2951–2965. https://doi.org/10.1002/bse.2781

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment*, *20*(4), 222–237. https://doi.org/10.1002/bse.682

Schaltegger, S., Beckman, M., & Hansen, E. (2013). Transdisciplinarity in corporate sustainability: Mapping the field. *Business Strategy and the Environment*, *22*(4), 219–229. https://doi.org/10.1002/bse.1772

Schröder, P., Lemille, A., & Desmond, P. (2020). Making the circular economy work for human development. *Resources Conservation and Recycling*, *156*, 104686. https://doi.org/10.1016/j.resconrec.2020.104686

Shepherd, D. A., & Patzelt, H. (2011). The new field of sustainable entrepreneurship: Studying entrepreneurial action linking what is to be sustained with what is to be developed. *Entrepreneurship Theory and Practice*, *35*(1), 137–163. https://doi.org/10.1111/j.1540-6520.2010.00426.x

Spigel, B., & Harrison, R. (2018). Toward a process theory of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, *12*(1), 151–168. https://doi.org/10.1002/sej.1268

Stahel, W. R. (2019). *Economia circolare per Tutti: Concetti base per Cittadini, politici e imprese*. Edizioni Ambiente.

Stahel, W. R., & Reday-Mulvey, G. (1981). G. *Jobs for tomorrow: The Potential for Substituting Manpower for Energy*. Vantage Press.

Stake, R. E. (1995). *The Art of case study research*. Sage Publications.

Stake, R. (2005). Qualitative case studies. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 443–466). Sage publication.

Stam, E., & Spigel, B. (2018). Entrepreneurial ecosystems. In R. Blackburn, D. De Clercq, & J. Heinonen (Eds.), *The SAGE handbook of small business and entrepreneurship*. SAGE Publications.

Stewart, R., & Niero, M. (2018). Circular economy in corporate sustainability strategies: A review of corporate sustainability reports in the fast-moving consumer goods sector. *Business Strategy and the Environment*, *27*(7), 1005–1022. https://doi.org/10.1002/bse.2048

Subramaniam, M., & Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, *48*(3), 450–463.

Sun, P., & Anderson, M. (2008). An examination of the relationship between absorptive capacity and organizational learning, and a pro- posed integration. *International Journal of Management Reviews*, *12*(2), 130–150. https://doi.org/10.1111/j.1468-2370.2008.00256.x

Teixeira, M. A. C., Ramos, H. R., & Bezerra, C. M. S. (2023). Circular economy in entrepreneurial business models: A systematic literature review. *Revista Economia & Gestão*, *23*(66), 5–23. https://doi.org/10.5752/P.1984-6606.2023v23n66p5-23

Thurmond, V. A. (2001). The point of triangulation. *Journal of Nursing Scholarship*, *33*(3), 253–258. https://doi.org/10.1111/j.1547-5069.2001.00253.x

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, *4*(3), 356–367. https://doi.org/10.1177/1534484305278283

UNIDO (2019). *Circular Economy and the Montreal Protocol Division*. UNIDO, Vienna International Centre. Retrieved March 10, 2021, from https://www.unido.org/sites/default/files/unido-publications/2023-02/CIRCULAR-ECONOMY-and-the-Montreal-Protocol-Division-en.pdf

United Nation General Assembly (2015). *Resolution adopted by the General Assembly on 11 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development.* New York: United Nations. Retrieved November 10, 2022, from https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Urbinati, A., Chiaroni, D., & Chiesa, V. (2017). Towards a new taxonomy of circular economy business models. *Journal of Cleaner Production*, *168*, 487–498. https://doi.org/10.1016/j.jclepro.2017.09.047

Vuorinen, T., & Kurki, T. (2012). Network management: Governance mechanism, opportunities and contradictions. *Rivista Piccola Impresa/Small Business*, *2*, 81–92. https://doi.org/10.14596/pisb.28

Welter, F., Baker, T., Audretsch, D. B., & Gartner, W. B. (2017). Everyday entrepreneurship—a call for entrepreneurship research to embrace entrepreneurial diversity. *Entrepreneurship Theory and Practice*, *41*(3), 311–321. https://doi.org/10.1111/etap.12258

Westphal, T. G., & Shaw, V. (2005). Knowledge transfers in acquisitions-An exploratory study and model. *MIR: Management International Review*, 75–100. https://doi.org/10.1007/978-3-322-91003-5_5

Whalen, K. (2019). Three circular business models that extend product value and their contribution to resource efficiency. *Journal of Cleaner Production*, *226*, 1128–1137. https://doi.org/10.1016/j.jclepro.2019.03.128

Wolk, A. (2008). *Advancing social entrepreneurship. Recommendations for policy makers and government agencies*. Root Cause/MIT. Retrieved May 5, 2022, from https://rootcause.org/publication/advancing-social-entrepreneurship-recommendations-for-policy-makers-and-government-agencies/

Wurth, B., Stam, E., & Spigel, B. (2022). Toward an entrepreneurial ecosystem research program. *Entrepreneurship Theory and Practice*, *46*(3), 729–778. https://doi.org/10.1177/1042258721998948

Xu, B., Yu, H., & Li, L. (2021). The impact of entrepreneurship on regional economic growth: A perspective of Spatial heterogeneity. *Entrepreneurship & Regional Development*, *33*(3–4), 309–331. https://doi.org/10.1080/08985626.2021.1872940

Yin, R. K. (1994). *Case study research design and methods: Applied social research and methods series* (2nd ed.). Sage Publications Inc.

Yin, R. K. (2009). Case study research: Design and methods, essential guide to qualitative methods in organizational research. *Applied Social Research Methods Series*, *219*(2), 212–259. https://doi.org/10.33524/cjar.v14i1.73

Yin, R. K., & Pinnelli, S. (2005). *Lo studio Di Caso Nella Ricerca Scientifica: Progetto e Metodi*. Armando Editore.

Zucchella, A., & Urban, S. (2019). *Circular entrepreneurship. Creating responsible enterprise*. Palgrave Macmillan.

Authors and Affiliations

Alessandra De Chiara[1]

✉ Alessandra De Chiara
adechiara@unior.it

[1] Department of Human and Social Sciences, University of Naples L'Orientale, Largo San Giovanni Maggiore, 30, Naples, Italy