Circular start-ups – a new typology for sustainable entrepreneurship

Benzidane Fatma zohra [1] ♦Terchani Siham[2] Abdaoui Nawal [3]

[1] University of Chlef (Algeria), f.benzidane@univ-chlef.dz

[2] University of Chlef (Algeria), s.terchani@univ-chlef.dz

[3] University of Blida 2 (Algeria), n.abdaoui@univ-blida2.dz

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Abstract:

The circular economy is becoming an increasingly discussed topic within business, yet incumbents still struggle with implementing circular strategies. Start-ups, however, prove a promising avenue for the implementation of new innovations such as circularity. While currently in the entrepreneurial space, many founders are trying to create circular start-ups, and awards and programs specifically focussed on supporting them.

This study aimed to identify startups and their most important characteristics, in addition to the areas of application of these companies for their business and the results reached .

This study aimed to differentiate between traditional entrepreneurship, sustainable entrepreneurship and circular start-ups and concluded that circular startups aim to prolong life and promote the effective use of natural resources in the production chain and the aim is the optimal use of natural resources and their reuse.

Keywords : circular economy,circularity strategies, sustainable entrepreneurship ,circular start-ups

♦ **Corresponding author.**

I- Introduction :

The depletion of natural resources and increase in volumes of waste. It describes an economic system capable of regenerating itself in the life cycle of production and consumption, in which waste is subsequently used or reused as raw materials in the production process from this perspective, the circular economy is based on a paradigm shift, as any waste can become raw material. The World Bank estimates that the circular economy offers an alternative that can yield up to $4.530tn in economic benefits by 2030, yet only 8.6% of the world is currently applying this circular system.

As a start-up is a new, independent, and active company striving for a scalable business of an in-ternational level, a circular start-up is, additionally pursuing a circular business model Circular entrepreneurship is hence essentially moulded by the concept of a circular business model. A business model depicts the logic of how an organisation creates, delivers, and captures value. A circular business model is defined by Geissdo-erfer et al as "business models that are cycling, extending, intensifying, and/or dema-terialising material and energy loops to reduce the resource inputs into and the waste and emis-sion leakage out of an organisational system. This comprises recycling measures (cycling), use phase extensions (extending), a more intense use phase (intensifying), and the substitution of products by service and software solutions (dematerialising)

The concept of a sustainable business model is commonly perceived as a modification of a con-ventional business model. Sustainable business models embrace sustainability-oriented

For by means what already stated can ask this question:

What are the characteristics of circular startups? And what are their (start ups) most important models

Research significance

-Definition of circular startups and their most important models.

- explore the factors which motivate circular start-up founders in their path towards sustainability.

- identify and explain the components of the circular business model innovation..

research objectives

Our study seek to make a better understanding of of the role of entrepreneurs' personal motivation in transition into the sustainable circular economy and circular enterprises as an important part of this new economy. It can provide additional insight into business models of circular start-ups. We believe there is a gap in the existing literature with reference to the identification of potential drivers for innovative solutions in sustainable entrepreneurship. There is also a gap in analysing the specific enablers of sustainability approach in small enterprises

Research methodology descriptive approach to descriptive research

This topic was studied by following the descriptive approach to clarify the various concepts as well as the analytical approach in order to facilitate the full understanding of the topic by highlighting all its parts.

1- The emergence of circular startups

1.1-Circularity is more than just recycling

One of the most widely used conceptualizations of circularity strategies is the so-called 4R-framework, which comprises four different 'R-strategies': **Reduce**, **Reuse**, **Recycle** and **Recover** . In order to better accommodate the start-ups engaged in the development of nature-based solutions, the authors of this paper have added a further category: **Regenerate**. Nature-based solutions are intended to increase the use of ecosystem services, which provide the benefits humans receive from ecosystems. Examples of ecosystem services include the likes of green roofs or walls, as well as urban green spaces, which rely on a relatively small input of nonrenewable natural capital and invest in renewable natural processes.

The R-list establishes a clear hierarchy of priorities for waste management methods: the first R (**Regenerate**) is given priority over the second R (**Reduce**) and so on, with the degree of circularity decreasing progressively down the list.

These strategies can be applied within the two types of material cycles characterizing the CE14,15: the biological cycle, which encompasses the flows of food and biologically-based materials (for instance, cotton and wood) that are designed to return to the biosphere through processes such as composting or anaerobic digestion; and the technical cycle, which relates to the flows of inorganic or synthetic materials.

Table1 : CIRCULARITY STRATEGIES

STRATEGY	DESCRIPTION
Regenerate	Maintain and increase the delivery of ecosystem services (providing the benefits humans receive from ecosystems)
Reduce	**Increase efficiency of product design or manufacturing by preventing or minimizing use of specific hazardous materials or any virgin materials, or make product use more intensive via such as product sharing**
Reuse	**Bring products back into the economy after initial use, or extend the lifespan of products and their parts (through repair, maintenance, secondhand markets, etc.)**
Recycle	**Process materials via such as shredding or melting to obtain materials of the same quality (upcycling) or lower quality (downcycling)**
Recover	**Incinerate residual flows and recover embodied energy**

(Thomas Bauwens , October 2019, p. 9)

1.2-Entrepreneurship theory

1.2.1 Traditional entrepreneurship entrepreneurship theory can be described as a complex phenomenon that includes the exploration, evaluation, and exploitation of opportunities to create value that has not existed before (Shane, 2003). Entrepreneurship has been investigated from economic, psychological, and social contexts to various analyses on individuals, groups, and populations (Venkataraman, 2019). To be capable of exploring and exploiting opportunities, *entrepreneurs* need to be alert to opportunities and optimise existing combinations of resources (Kirzner, 1979). Contrary, Schumpeter (1942) describes an entrepreneur as an innovator who creates value through creative destruction, a fundamental new combination of resources.

The entrepreneurial process describes the journey towards new business creation; starting from the discovery of the opportunity, the decision to exploit the opportunity, resource acquisition, entrepreneurial strategy, organising process to the development of business performance (Shane, 2003). This journey is often accompanied by a high degree of uncertainty, time pressure, and intense emotions (Shepherd, 2011). The entrepreneurial process links the identification and exploitation of opportunities to the value proposition

1.2.2 Sustainable entrepreneurship Recognizing the limits of our planetary resources lays the foundation for questioning the current linear economic system and favouring sustainable innovations. Consequently, sustainable development has been discussed as a core topic in public, business, and policy debates, and recently also in scholarly literature exploring green business strategies and sustainable entrepreneurship

In contrast to traditional entrepreneurship, ***sustainable entrepreneurship*** describes the identification, development, and exploitation of opportunities to create future goods and services that benefit society, the environment, and the economy. According to Belz and Binder (2017), sustainable *entrepreneurs* strive to bring the triple-bottom- line of economic,ecological, and social objectives to an equilibrium. The authors argue that the integration of a triple-bottom-line develops sequentially as early-stage sustainable entrepreneurs usually start with a double-bottom-line approach targeting first sustainable and economic goals, followed by a social dimension. The logical conclusion is that sustainable entrepreneurs contribute to environmental and social welfare as their actions enhance the efficiency of markets and limit environmental damages

(Geissdoerfer, 2017, pp. 757−768)

1.2.3 Circular entrepreneurship The two concepts of sustainability and CE are both gaining increasing attention in theory and practice Sustainability is an objective which meets the needs of the present without compromising on the needs of future generations (Brundtland, 1987), and CE is a means to achieve this objective . Whereas sustainability can be considered a broad concept with open-ended goals, the concept of CE mainly targets closed loops to foster a circular use of resources and waste. Thus, circularity is considered as one approach contributing to the SDGs

Whilst a linear BM usually generates value in a material flow where virgin materials enter the value chain upstream and all product value is produced by manufacturing and user behaviour, a CBM uses existing resources to generate value aiming for slow- or closed-loop resource flows and thus, has a smaller ecological footprint than traditional BMs (OECD, 2019). CBMs need to engage with a complex range of stakeholders and therefore, shift their focus from customers to multi-stakeholders

2.Description and significance of circular Startup

Circular Startup aims to prolong the life and promote the efficient use of natural resources in the production chain .

2.1 A theory of circular Startup

Sustainable entrepreneurs act in order to create sustainable development through entrepreneurial corporate activities . These entrepreneurial corporate activities are described as realizing sustainability innovations aimed at the mass market

The principle of circular economy is built on the notion that all resources should be able to sustain indefinitely, thereby covering the entire realm of sustainability: resources, energy, labour.

This means that in essence: circular entrepreneurs are always sustainable entrepreneurs, but not the other way around (table 1).

Table:2 Main goals of different types of entrepreneurship, compared to their entrepreneurial typologies.

Main goal / **Type**	Enterprise according to the circular economy principles	Creating sustainable development through entrepreneurial corporate activities	Achieve societal goals and secure funding to achieve this	Developing new institutions or facilitating change in existing institutions
Circular entrepreneurship	Yes by definition	Yes	Yes	Likely
Sustainable entrepreneurship	No	Yes by definition	Possibly	Possibly
Social entrepreneurship	No	Possibly	Yes by definition	Possibly
Institutional entrepreneurship	No	Possibly	Possibly	Yes by definition

(DAALDEROP & TIM DAALDEROP , 2013, pp. 9-10)

Social entrepreneurs are very similar to sustainable entrepreneurs. The difference is that social entrepreneurs act in order to achieve their societal goals in the first place, securing funding is considered the means to an end From that follows logically that a social entrepreneur (when striving to a goal that promotes environmental sustainability as well as social benefits) can in some cases be called a sustainable entrepreneur as long as the entrepreneurial corporate activities are a means to an end. Therefore, circular entrepreneurs are always sustainable entrepreneurs and sometimes social entrepreneurs but not the other (DAALDEROP & TIM DAALDEROP , 2013, pp. 9-10)

Sometimes material, product or organisational innovations require a change in market-conditions in order to become successful . Sustainable entrepreneurs dealing with these kinds of innovations will have the ambition to change these institutional barriers in their favour .Hence: when sustainable or social entrepreneurs are creating a more supportive institutional setting by changing or creating new institutions, it follows that they are also institutional entrepreneurs. This is not always the case for social or sustainable entrepreneurs. Circular entrepreneurs, however, will encounter institutional barriers almost

by definition. After all, they propose an alternative economic system with which the institutions still have to be aligned.

Concluding; some social or sustainable entrepreneurs are also institutional entrepreneurs, but circular entrepreneurs are likely to also be institutional entrepreneurs. Institutional entrepreneurship should be an almost necessary characteristic of circular entrepreneurship and as a potential beneficial characteristic of social- and sustainable entrepreneurship.

(chnitzler, September 2012, pp. 13−26)

2.2.Intersection of different concepts between Sustainable entrepreneurship, Sustainable start-up Circular Startup,

Corporate sustainability in business strategies and processes has recently become a promising way to cope with the global challenges formulated in the United Nations Sustainable Development Goals (SDGs) under the label of "sustainable strategic management" or "sustainability innovation strategy.

An important question remains regarding whether sustainability can entail the need to modify or even significantly alter a corporate business strategy or a business model. The corporate sustainability concept clearly represents an innovative change in an attempt to optimise the value for all stakeholders, that is, to create integrated value .

Although companies that implement sustainability have various ways of formulating their business goals, they frequently refer to stakeholder value shared value sustainable value or regenerative value. Sometimes these firms use several SDGs as the purpose and foundation of their strategy.

Diverse attitudes regarding the integration of sustainability into the corporate strategy have been widely discussed In practice, however, the corporate world seems to see no genuine possibility of rethinking strategic management to ensure a sustainable future for their organisations and society at large A new phase of sustainability management is needed because sustainable business

is reaching the limits of what it can accomplish in its present form . As previously stated, there is a significant disconnect between sustainable business on an organisational level and sustainability development on a global level or between business activity and the global state of the environment and society Looking for a new perspective on sustainable development, a number of researchers have turned their attention to SMEs .

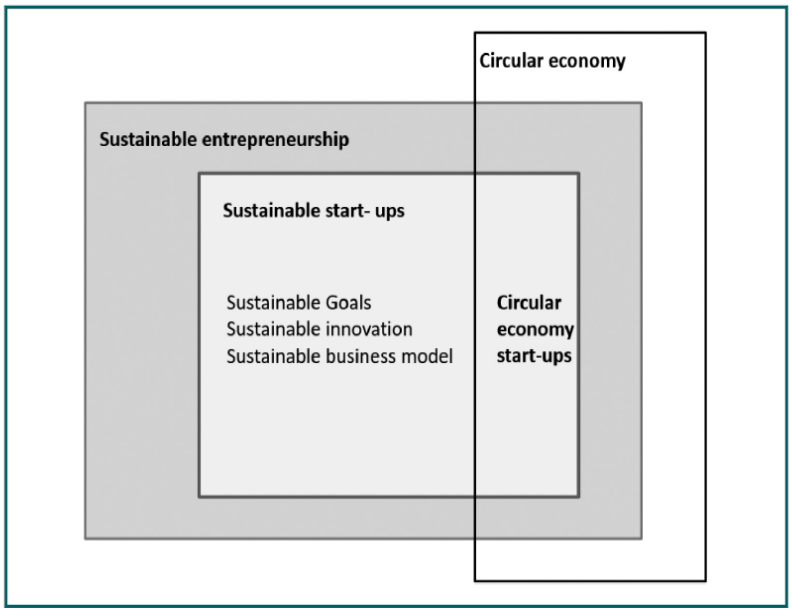
. SMEs are considered the backbone of the European Union (EU) economy, representing 99% of all businesses and providing two-thirds of the total private sector employment in the EU Entrepreneurship is perceived not only as a source of achieving different economic goals, but also as a means to address persistent sustainability challenges The concept of sustainable entrepreneurship has emerged as an overlapping research and practice area between sustainable development and entrepreneurship and has been defined as the recognition, development and exploitation by individuals of opportunities to bring into existence future goods and services with economic, social and ecological gains .

-Sustainable entrepreneurship has the potential to create radical change, not merely incremental, by combining activities and processes that lead to the development of profitable opportunities, while contributing to sustainable development .

- Sustainable entrepreneurship can be described as an innovative, market-oriented and personality-driven form of creating economic, societal and/or ecological value by means of reakthrough environmentally or socially beneficial market or institutional innovations . While the sustainable entrepreneurship literature draws attention to smaller enterprises, the bulk of the research on environmentally and sociallyresponsible practices has focused on larger companies that have operated in the market for years Therefore, to advance the discourse on sustainable entrepreneurship, we seek to explore attitudes of innovative start-ups to sustainability. We define a start-up as a temporary organisation which seeks to apply

a repeatable, scalable and innovative business model . What distinguishes them from other enterprises are their goals (intentions).
sustainability improvements (particularly process innovations) or the introduction of a new product, which can be considered as a means of generating greater sustainability In contrast, business model innovation does not necessarily involve discovering a new product or service; instead, it uses new ways to create and deliver the existing product or service and new ways to capture value from them. Business model innovation has attracted considerable attention in the literature and industry recently, and it is increasingly suggested that such innovation is a key to future business development, increasing the market value of the enterprise Business model innovation is emerging as a potential mechanism to integrate sustainability into business, whether such a process occurs in small, middle or large companies Nevertheless, the dominant approach to innovation continues to focus on the development and implementation of technological innovations, the elements of the change process management and the possibility to align a company's capabilities with the market expectations. Social challenges and the impact of innovation on improving the quality of the natural environment are not typically analysed in this context. Yet, an increase in the level of innovation remains a key challenge not only in terms of the competitiveness of the economy, but also in terms of addressing the major challenges facing the society, formulated as the SDG framework.(**FIGURE 2)**

FIGURE 1: Intersection of different concepts



Source : (Boleslaw Rok , 2020, p. 5)

2.3. Defining circular Startup

Entrepreneurial activity is not solely related to start-up development, as it can be found all through-out business activity, from small businesses to large firms in the form of intrapreneurship. However, start-up development is driven by, and therefore inherently linked to, entrepreneurial activity . This research will look into entrepreneurs involved in the creation of start-up businesses since this is the area where potential disruptive innovation most likely takes place, as described in the introduction. Following the logic of Carland et al. (1984), entrepreneurs and their entrepreneurial ventures are differentiated in this research from other small business ventures, such as small non-growth oriented

businesses, by the principal goals of profitability, growth and innovative strategic practices. This distinction of a differing entrepreneurial focus shows the importance of looking deeper into the founders of start-ups, how their motivation towards those principal goals is shaped.
To understand where the ideas for entrepreneurial business ventures come from, it is important to understand entrepreneurial intentions Looking into circular entrepreneurship there is little research specifically on this topic and no clear definition of a circular entrepreneur. differentiate between various types of sustainable entrepreneurship, including ecopreneurship, social entrepreneurship and institutional entrepreneurship, yet there is no mention of a circular entrepreneur. This nuance is important to make as the circular economy and sustainability are not interchangeable concepts (Geissdoerfer et al., 2017). Often, entrepreneurs engaging in the circularity are placed in the field of social entrepreneurship (Social Enterprise NL, 2018). However, considering the increased amount of programs (incubators and accelerators), start-up awards and challenges specifically focussing on entrepreneurs with a circular solution, it is argued that a separate look into this new type of circular entrepreneur is required.
One of the first definitions of circular economy comes from the Ellen MacArthur Foundation report who describe it as "an industrial system that is restorative or regenerative by intention and design" (Ellen MacArthur Foundation, 2013). Circular business models are defined as a business model retaining economic value of products after use in the production of new offerings . Similarly, Mentink (2014) describes it as how an organization can create and capture value using closed material loops. The main building blocks of circularity are depicted as: design out of waste/design for reuse, build resilience through diversity, rely on energy from renewable resources, think in systems and share values/symbiosis . A similar operationalization is seen within the 4R framework, which states that actors in the circular economy aim to either reduce, reuse, recycle or recover material flows . Following this contextualization, a circular entrepreneur would therefore be aiming to implement one or more of these elements when creating a business. Important to note is that circular business models do not necessarily look to balance ecological and social needs, although they can serve sustainable goals
Mentink, 2014). Scott (2013) describes that sustainability instead is a mechanism that enables the circular economy. Hence, even though circular entrepreneurs share overlap and similarities to sustainable and social entrepreneurship, it is important to view this group separately if one is looking to define an understanding of this type of entrepreneur. One differentiation comes in the form of circular versus linear business models, which can be seen below and will be used further in this thesis when comparing and developing conclusions (Nancy M.P. Bocken, de Pauw, Bakker, & van der Grinten, 2016). With this definition the importance of assessing circular entrepreneurs becomes more apparent, since social entrepreneurs for example can also operate in a linear fashion.
- **Circular entrepreneurs***:* entrepreneurs that founded or operate a start-up with a business model containing a circularity approach of slowing, closing or narrowing resource loops through either reduce, reuse, recycle or recover strategies

- **Linear entrepreneurs***:* entrepreneurs that founded or operate a start-up with a business model that does not have a distinct focus on slowing, closing or narrowing resource loops, but rather operates with a traditional business model of production of take-make-use-dispose (Thijs Hoogenstrijd , 2019, pp. 3–4)

2.3 significance of circular entrepreneurship
The objective is the optimal use and reuse of natural resources. How do we as a financial institution contribute to this objective? We want to promote sustainable progress. We do

this by aligning our financings and investments with our sustainability policy. This policy rests on our three pillars:
human rights, climate and biodiversity. The sustainability policy helps us to make choices. We do not finance or invest in activities that are not sustainable. For instance, we avoid investments in companies that produce fossil fuels or engage in activities relating to mining, weapons or tobacco. Companies and countries that we consider eligible for
investment or finance are rigorously assessed for sustainability. These choices enable us to mitigate the negative impact and increase the positive impact in respect of our three pillars. How this applies to circular entrepreneurship is explained below:
-Climate: more efficient and careful use of natural resources and products leads to less carbon emissions and is therefore better for the climate. (Bauwens & Mees, , 2020)
- Biodiversity: less use of natural resources leads to less land-system change, less polluting emissions and less overexploitation. Metals, for instance, are typically found underground. Their extraction requires the removal of above-lying natural habitats and causes extensive pollution. If we reuse the metals that are already at our disposal, we can avoid further encroachment on eco-systems. (European Commussion, circular Economy., 2020)
- **Human rights**: the extraction of natural resources often involves the violation of human rights. In the Democratic Republic of the Congo, for instance, children are forced to work in appalling conditions in cobalt mines. By making strict demands on the origin of conflict minerals, we seek to minimize human rights violations.

3. Models And Characteristics of Circular start-ups

3.1 Models of Circular start-ups

Lewandowski proposed models of circular startups, which he categorized into groups - **Table2**)

Table3: Circular Startup Models

Field of activity	Models
Circular Construction	**Natural Fiber-based Insulation Material- Renewable Construction Business Models- -Waste-to-Construction Materials - Adaptive Modules- -Sustainable Construction Marketplaces**
Circular Packaging	**-Packaging from Agricultural Waste & Residue -Alternatives to Plastic Packaging -Reusable & Returnable Packaging -Compostable Food Containers -Biomaterials for Packaging**
Food Processing	**-Waste Valorization Solutions -Insect-based Protein -Cellular Agriculture - Microalgae Production -Byproduct Upcycling**
Surplus Food Management	**-Food Sharing Platform -On-Demand Surplus Food Pickup -Marketplace for Close-to-Expiration Food -Logistics Platform for Surplus Food Management -Access to Discounted Food from Local Restaurants**
Smart Recycling	**-Smart Waste Collection Centers -Smart Waste Bins -Mineral Recycling Technology -Concrete Recycling**

	-Lithium-ion Battery Recycling
Recyclable Materials	**-Recyclable Straws -Insulation Materials** **-Recyclable Apparel -Mycelium-based Materials** **-Sustainable Construction Materials**
Recyclable Products	**-Hangers - Clothing** **-Furniture - Beverage Bottles -Toys**
Metals & Mining	**-Urban Mining -Supply Chain Traceability** **-Metal Waste Recycling -Metal Extraction**
e-Waste Management	**-Electrochemical Processing -End-of-Life Electronics** **-Metal Recovery -e-Waste Refurbishing** **-Data Center Decommissioning**
Rubber Recycling	**-Sustainable Devulcanization Technology -Advanced Microwave Technology** **-Low-Temperature Vacuum Pyrolysis -Chemical Regeneration** **-Scrap Tire Conversion Technology**
Design from Waste	**-Wood Waste Upcycling -Art from Waste** **-Organic Waste Upcycling -Recycled Textiles** **-Upcycling R&D**
Repair	**-Circular Economy for Electronics -Circular Fashion** **-Repairing Degenerated Plastics -Repair in Retail** **-Reverse Logistics**
Repurposing	**-Repurposing Used Batteries -Repurposing Asphalt** **-Remanufacturing Vehicle Battery Packs -Carbon-Neutral Laptop** **-Converting Plastic Waste into Building Materials**
Zero-Waste	**-Brewery Wastewater into Hydrogen -Reverse Logistics** **-Zero-Waste Grocery Stores -Mobile Composting Vans** **-Plastic-to-3D Printing Material**
Small Space Living	**-Flexible Furniture -Mini Dishwashers** **-Electronics-enabled Furniture -Bathroom Space Optimizatio** **-Vertical Aeroponics for Small Spaces**

(Startups, 2022)

3.2 Characteristics of Circular start-ups

Circular startups have a set of characteristics that we mention as follows:

3.2.1 Scale-up potential

In contrast to the observations made by some researchers who pointed out to the locality of the problems addressed by social enterprises, the challenges addressed by circular start-ups are universal in nature because they reflect global phenomena related to waste management.

3.2.2Empowerment

Another factor driving the development of start-ups is a sense of impact and empowerment among entrepreneurs, which comprises a sense of control, i.e. a feeling that positive and negative outcomes depend on what we do in our lives; a sense of self-efficacy.

3.2.3 Sustainable orientation

The start-up founders we studied can be classified as visionary types of green entrepreneurs, as identified by who pursue a sustainable
orientation. Ecopreneurs perceive the protection of the natural environment as an important end in itself rather than merely a component of the economic goal Environmental issues form the core of the start-up concept, whereas social aspects tend to be complementary. (Blomsma & Brennan, , 2017, pp. 603-614)

3..2.4 Path towards circularity

The enterprises examined generally relate to the concept of sustainability. However, this term appears merely as a general idea which sets the direction for changes but is irrelevant for them on an operational level. As indicated by one of Syntoil founders, "this is an empty slogan", and the goals of an organisation need to be transformed into a circular business project. In this context, the term "circular" appears to be more meaningful in practise than the term "sustainable", because it describes a means to achieve a certain level of sustainability whereas the concept of sustainable development often concentrates on creating the economic, environmental and social value, while failing to identify specific ways to achieve it . (Amankwah-Amoah, 2018, pp. 78-88)

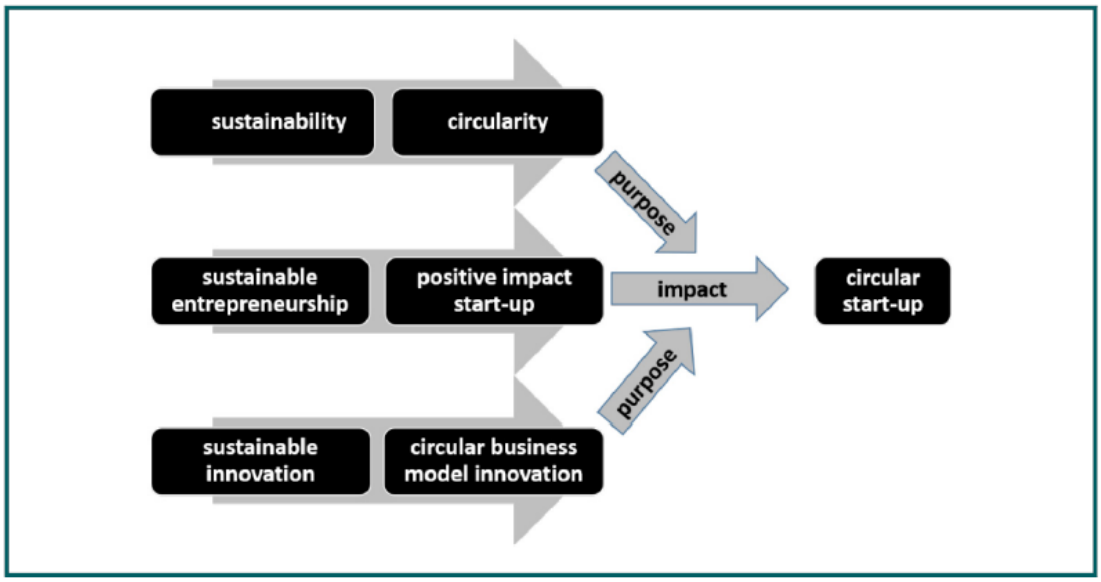
3..2 5 Positive impact

Another result of this study is the observation of the shift from the company's perspective and value creation to positive impact maximisation, which represents the stakeholders' perspective. Sustainable value proposition should indicate the benefits and costs to other groups of stakeholders and specifically the society and the natural environment. Therefore, sustainability is not only something to act on, comply with or engage in, but also a major source for change . Start-ups use environmental opportunities. (Belz, 2017, p. 17)

3..2 .6 Circular innovation

Clear orientation on circular business model innovation is a major element shared by the start-ups covered by this study. This category of innovation is founded on re-thinking of the value proposition, or a product or service offered by a company to its stakeholders. From the strategic perspective, this type of business model innovation should provide a competitive advantage by creating greater value for customers and contribute to sustainability at the level of both the company and society at large. The ability to implement innovation, either incremental or disruptive, at the business model level represents the necessary business capability **(FIGURE 3**)

FIGURE 2: Circular start-up model

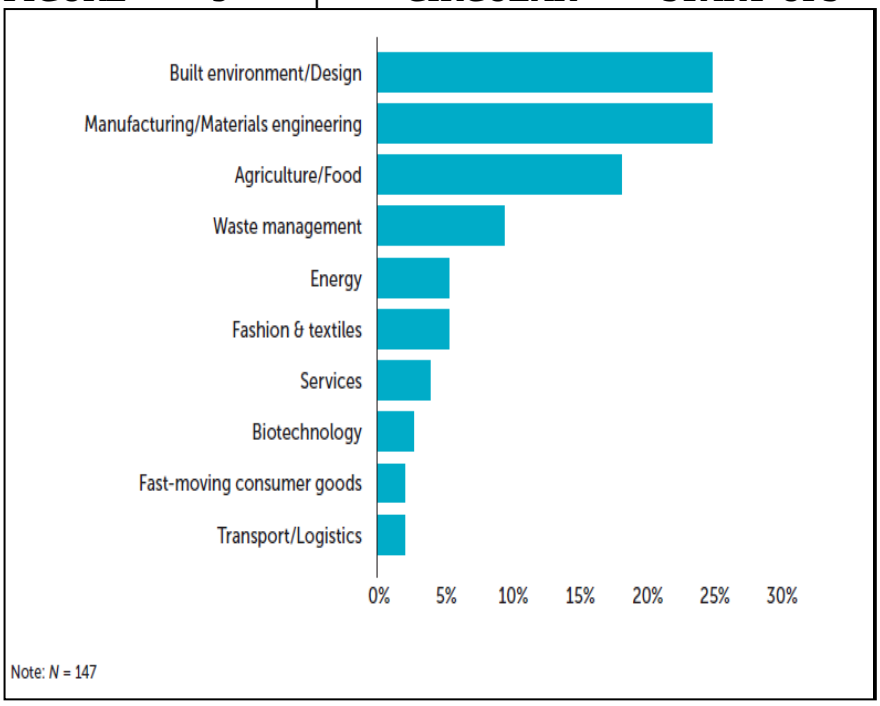


Source : (Boleslaw Rok , 2020, p. 5)

4.CIRCULAR START-UPS IN THE NETHERLANDS

Almost 35% of the circular start-ups identified as part of this research are located in Amsterdam, with about 10% in Rotterdam. Since Amsterdam and Rotterdam are the two largest economic hubs in the Netherlands, this is hardly surprising. Circular start-ups in the Netherlands thus tend to be concentrated in urban centers. Overall, 61% of circular start-ups are found in the Randstad region (comprising Rotterdam, Amsterdam, Utrecht and The Hague). The sectors in which they are most prevalent are built environment/design and manufacturing/materials engineering The latter sector includes all start-ups that convert recycled or virgin materials, components or parts into non-food finished goods such as notebooks or cell phones. The sector that comes next in terms of importance is agriculture/food, followed by waste management. Interestingly, the top three sectors in which start-ups are present roughly correspond to three of the priority sectors that the Dutch government targeted to switch to a CE (manufacturing, construction, and biomass and food) — suggesting a degree of alignment between the entrepreneurial activities in the CE and the objectives of the government.

FIGURE 3 | CIRCULAR START-UPS BY SECTOR

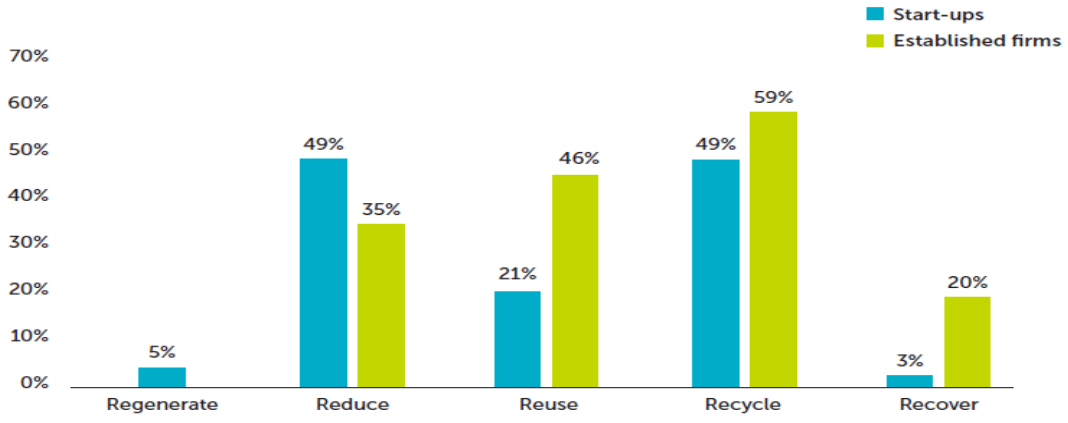


Source :(Bauwens & Mees, , 2020 p 12)

Through the figure number 4 we notice In total, 49% of circular start-ups have adopted the Reduce strategy. An example of a start-up in this category is the Rotterdam-based CONCR3DE, which has developed 3-D printer technology to produce complex components for the construction industry. For the printing, CONCR3DE uses inorganic polymers as an alternative to Portland cement, the main component of concrete, resulting in an 85% reduction in carbon dioxide emissions. Also included in this category are start-ups based on PSS models, such as Swapfiets and Bundles, as showcased above.

Some 21% of the organizations in our sample have implemented the Reuse strategy. For instance, Roetz Bikes remanufactures bicycles discarded by the OV-fiets, a bike rental service of the Dutch railway Nationale Spoorwegen (NS), and transforms them into new vehicles, reusing 70% of the original bicycle materials.

FIGURE 4 Comparison of circularity strategies used in Netherlands



Source :(Bauwens & Mees, , 2020.P16)

Up to 49% of circular start-ups examined have adopted the Recycle circularity strategy. Examples in this category include Tusti, a high-tech recycling company that cleans greasy plastics and sells plastic regrinds (plastics that have been shredded into small flakes) to manufacturers, also New Marble, which manufactures tiles from old plastic bottles.

Finally, a small fraction of circular start-ups also employ the Recover strategy, including, for example, The Waste Transformers, which converts residual waste streams into energy, and Broodnodig, which converts bread waste into biogas via fermentation.

Overall, the findings suggest that a large majority of circular start-ups embrace strategies that correspond to relatively high levels of circularity (Regenerate, Reduce and Reuse). For balance, this output should be assessed against the efforts made by established firms. To do this, our results were compared to the R-strategies, analyzed in a previous study16, of 46 established firms engaged in CE activities in household goods and textiles, food and beverages, and packaging. Overall, the results show that compared to established firms, start-ups tend to pursue strategies higher in the circularity hierarchy. Of the higher strategies, only Reuse is more strongly embraced by established firms than by circular start-ups. This can be explained by the fact that reverse logistics processes (facilitating the management of returned parts, materials and products from the consumer back to the producer) are very complex, with established firms tending to have better resources to set up adequate take-back management

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Conclusion

In this paper we presented to define emerging institutions and their most important characteristics, in addition to the areas of application of these companies for their business and the results reached - Circular entrepreneurs can be the driving force behind the circular transition

RECOMMENDATIONS FOR POLICYMAKERS:

-Provide financial support in the form of grants, low-interest loans, or business incubators and training opportunities to help circular start-ups scale up their operations and increase brand awareness — patient capital is especially needed for companies developing pilot plants that have yet to prove their technology.

-Assess whether and how regulations that act as a barrier to adoption of circularity practices can be eliminated to reduce the regulatory hurdles often faced by circular businesses, without violating the primary objectives of these regulations .

-Help circular start-ups scale by boosting market demand for their products and services through various instruments: public procurement which incorporates favorable scoring criteria for tenderers that integrate circular start-ups into their offer; tax policies which make circular products relatively more attractive (for instance, through a lower value added tax on reused and repaired products); performance labels (aligned with national orEuropean harmonization initiatives) andconsumer information campaigns.

-Examine circular start-ups' activities and business models to identify circular solutions both within and between industries, plus incorporate best practices into own business models.

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