









Challenges of Start-Ups Developing Circular Business Models

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Abstract. The circular economy aims for an effective and efficient resource use. Thus, application of the concept can benefit the sustainability performance of companies. Specifically, business modelling is a key enabler for the transition to a circular economy. However, the related research is dominated by a focus on incumbent companies and their transition from linear to circular business models. This focus risks missing out on actors such as start-ups who can experiment with and develop potentially more radical circular business models. Thus, using interviews with 37 start-ups developing circular business models, we analyzed their characteristics and challenges. Our findings reveal that, such firms encounter general challenges related to circular business modelling and new venture development. Furthermore, such start-ups are often dependent on an ecosystem of actors to create, deliver and capture value based on circular principles. Thus, they encounter challenges to scale up their business based on their liabilities of smallness and dependency. Altogether, these challenges of “circular start-ups” call for a holistic approach to understanding their development process.

Keywords: Circular Economy (CE) · Entrepreneurship · Barriers

1 Introduction

Earlier research has shown that start-ups are more receptive to disruptive thinking and tend to embrace radical circular business models compared to incumbents [1]. Young firms adapt more easily to a circular economy (CE) than incumbent firms due to their agility and the lack of existing business models and investments. This is not to say, however, that start-ups developing circular business models do not face any obstacles. The attendant liabilities of size and newness to the market can impede their development due to limited resources and influence on a larger business ecosystem.

The knowledge gap addressed in this paper lies in uncovering the early growth and development process of “circular start-ups”, in their development of a circular business

model that can promote a widespread circular economy. Circular entrepreneurship is still a recent phenomenon in the literature [2]. Present research defines circular start-ups as “new, independent and active companies pursuing a circular business model” [1]. In this paper we aim to explore in more depth the early growth and development processes of circular start-ups. In this way, we seek to systematically analyse the challenges of circular start-ups. We have chosen to focus on the following research questions i) What characterises the early development process of circular start-ups? ii) What does it take for a start-up to be considered circular? iii) What challenges characterize a circular start-up? By this we strive to establish linkages between practical and scientific approaches to develop a circular economy. Moreover, policy actors interested in supporting the transition to circular economy can adopt results from this study as input for their engagement with start-ups.

2 Start-Ups Developing Circular Business Models

The concept of a start-up has been developing in parallel in both research and practice during the last thirty years as entrepreneurship has increasingly come to be viewed as central to economic activity and industrial renewal. In its most simple form, a definition of a start-up is that it “is looking for a business model” while existing firms “execute a business model” [3 p. 67]. Therefore, a start-up is “a temporary organization designed to search for a repeatable and scalable business model” [3 p. 67]. Meanwhile, the “EU Startup Monitor” that has studied start-up ecosystems in Europe takes three variables into account in its definition: low age, innovativeness, and growth intention (startupmonitor.eu, 2022).

The interest in start-ups has been growing due to its increased importance for entrepreneurs, and entrepreneurial ecosystems, as well as policymakers. Start-ups are in many instances relied upon as vehicles for transformation in developing fields such as digitalisation, cleantech, or creative industries. Fritsch [4] has summarized the general “supply-side effects” that start-ups tend to stimulate in the economy through providing alternatives to established business models: productivity increases, structural change, innovation & creation of new markets, and greater variety of available products/solutions. Hence, a lot of research interest has been directed towards what makes start-ups successful and how their development can be encouraged. Common topics that have been studied include e.g., success factors on both individual and firm level, financing of start-ups [e.g., 5], as well as the context and support surrounding start-ups [e.g., 6]. In a similar vein there has also been a lot of research interest into what kind of obstacles that start-ups face and how they can overcome these [e.g., 7]. For example, barriers related to specific demographic groups such as young people or students have been identified; as well as those related to specific aspects such as financing [8].

Since start-ups are highly dynamic phenomena they are challenging to study. An established model that can be applied to study their creation and development is Gartner’s framework from mid 1980-ies [9]. This model contains four interrelated nodes that make up the basis for understanding and analysing this process in a holistic way. It was an early attempt to organise the large number of characteristics that were used to describe the early development of new businesses. Gartner’s model was based on an

extensive literature review of previous entrepreneurship and new venture research while simultaneously striving to move beyond a unidimensional view of entrepreneurship and introducing variety within the phenomenon of entrepreneurship and new venture creation. The Gartner model enables us to understand the complexity of new venture creation through the four nodes (individual(s), organization, environment, and process) that need to be viewed together and that form distinctive combinations of circumstances. With the help of the model each new venture can be analysed and compared to others. The model recognizes that new venture creation is dependent on both individuals that act entrepreneurially and the organisation itself while constituting a process that develops over time within an environment where a marketplace exists with both opportunities, various resources, and risks. In this paper we use the Gartner model to describe our selected cases.

2.1 Circular Business Models (CBMs) and Barriers

Circular economy in general is a concept that encompasses a higher degree of “closed loops” through e.g., prevention of waste and resource efficiency as well as dematerialisation and utilisation of goods instead of ownership [10]. Subsequently, circular business models are models that aim at closing resource loops or extracting value from resources for as long as possible by applying circularity - or R - strategies. These include the regeneration of ecosystems through products and services, the reduction of scarce input materials, the focus on reuse of resources/products and the recycling and recovery of embedded value or materials at a resource’s end-of-life. Such business models can be implemented by both new and established firms, and to a varying degree (e.g., as an “add-on” or side business or a central operation). While the R-strategies are not mutually exclusive - e.g., a bio-material producer (i.e., reduce) might also recycle the by-products of their production processes - a dominant R-strategy can typically be identified when scrutinizing a firms’ business models. The dominant R-strategy is typically the strategy that receives the most budget in research and design and that creates the most revenue [1].

While insight into barriers for circular start-ups is scarce, the generic barriers for circular business models are scrutinized by a variety of studies. There are studies which investigate the challenges that small- and medium-sized business face when implementing CBMs but - similar to the dominant perspective on large corporations - these studies take on a business model transitions perspective and do not focus on ‘grassroots’ business activities [11]. While the barriers for CBMs that recent literature identified are of both endemic and systemic character, the magnitude of external barriers tends to outweigh internal barriers in this context [12]. This is not surprising given CE’s systemic character [13]. The typical external barriers relate to required changes in linear supply chains, lack of market readiness on supply and demand side, and a mismatch between CE practice and regulatory frameworks. Internal barriers are typically dominated by financial/resource, organizational and knowledge/technology dimensions. This study argues that the nurturing of bottom-up innovation - and particularly start-ups - in CE requires a more comprehensive perspective than only an environment and organizational view. As such, the role of the individual (i.e., the founder or entrepreneur) as well as the process perspective deserve more attention and an in-depth review in the context of ‘grassroots’

circular entrepreneurship. The founder motivation and identity play a key role in a venture's development path and success. Furthermore, we already outlined above that a processual view is required to structure and conceptually grasp the phenomenon of a start-up.

3 Method

The empirical data was collected using semi-structured interviews with start-ups developing circular business models. To identify start-ups for the interview study, we developed selection criteria based on existing literature. Start-ups selected for the interview, were: (i) registered firms with operational years of up to 6 years, (ii) profit-seeking ventures, (iii) independent ventures, not a subsidiary of an incumbent, (iv) focused on developing circular business model strategy (ies) as proposed by Bocken et al., [14]. Thus, we interviewed start-ups developing circular business models based on: (i) access/performance model, (ii) extension of product value, (iii) classic long-life model, (iv) encourage sufficiency, (v) extension of resource value, and (vi) facilitation of Industrial Symbiosis (IS). In total, we interviewed 37 start-ups in Europe. Out of the 37 cases, we have selected five illustrative examples for this paper. These five cases are selected based on a diversity strategy and thus cover the entire typology of circular business model strategies proposed by Bocken and others [14]. The interview questions covered a description of the business model the company was developing, their challenges while developing such a model and potential relation between the business model components and the challenges. All interviews were recorded and analysed thematically.

To answer our research questions, we define the start-up as our unit of analysis. Thus, we analysed holistically their challenges when developing circular business models. To do so, we adopted an existing model of new venture creation Gartner [9] which synthesizes four aspects as characteristic of new venture creation. We used this model to categorize the different challenges we identified from our interviews. Finally, we analyse these challenges against the background of existing literature on the challenges of circular business modelling [e.g., 15] and new venture development.

4 Empirical Findings

In this section, we present challenges of selected start-ups each developing different types of circular business models - as indicated in the parenthesis in the subheading.

4.1 Case 1 (Extension of Resource Value) – GoCirkulär

The start-up describes their purpose in the following way: “At Go Cirkulär, we manufacture high-quality skincare products that are upcycled, gender-neutral, and 100% natural” (gocirkular.se, 2022). Currently the start-up makes two cosmetics products that are both based on upcycled coffee waste (a body scrub and a body oil). Coffee waste for their production is sourced from local partners such as cafes. Production is small-scale and done by the firm itself in a lab in Malmö. They sell directly to consumers in Sweden and rest of EU via their own homepage and indirectly via other firms' stores (such as partner cafes) and online web shops.

Challenges Related to the Individual(s): The founder describes that being a female and immigrant entrepreneur is challenging. This is partly related to a lack of contacts and networks which the founder describes as being very important when doing business in Sweden. Partly it also implies being taken less seriously as an entrepreneur.

Challenges Related to the Environment: The company is dependent on partners to source coffee waste, but this is not viewed as a major challenge since a lot of coffee is consumed in Sweden, so a shortage is not likely. Since the company plans to expand their product line in the future new partnerships are needed so that other upcycled ingredients can be sourced. Being in cosmetics industry and striving to be circular means that the company is not well understood by actors in e.g., business support and funding. The founder describes that it is a challenge to “get people onboard” with the business idea. For example, the company might be viewed as mainly altruistic and not a potentially profitable business. There is a difference from how other sustainability related industries, e.g., “cleantech”, are viewed. The founder feels that she needs to work against stereotypes when developing the business. The founder also mentioned that cosmetics is a regulated industry. This implies having to fulfil strict requirements which can be challenging for a start-up.

Challenges Related to the Organization: The business needs to operate as a lean organization and use their limited resources in an efficient way which is challenging. As mentioned earlier, the founder states that personal contacts and referrals are important when developing a business in Sweden. Now a lot of the founder’s time goes into networking since this has been identified as vital.

Challenges Related to the Process: As the company develops it is considered a challenge to balance a local business model with scaling up and international/global expansion. Expanding and growing would probably mean having less control over the ingredients and other aspects of the business according to the founder. Finally, it is challenging to develop new products to make their product range broader. This requires research of potential ingredients that can be used in cosmetics, followed by product development, and complying with regulatory requirements.

4.2 Case 2 (Access/performance Model) – Jonnabike

Jonnabike is a start-up that assembles, owns, and leases bicycles to customers for a fixed fee per month. By retaining ownership of the bicycles, the company can service, repair, and re-use bicycle components. The company has only one bicycle model with the idea to be able to recover and interchange components and thus prolong bicycle life span. The value proposed to their customers is the availability of a functioning bicycle at their disposal for a fixed fee. The company targets both long term customers who seek reliability and short-term customers who seek flexibility.

Challenges Related to the Individual(s): No challenges have been mentioned during the interview.

Challenges Related to the Environment: Cash flow and profit margins connected to leasing bicycles are relatively small and thus financiers are reluctant to engage with the company. Risk capitalists struggle to evaluate the residual value of bicycles due to lack of data. Financiers such as banks are more familiar with traditional business models such as buying and selling products. As the interviewee puts it “the approach to own and lease out bicycles is difficult to understand by the financial sector” and thus “the more you come closer to the linear model, the more the banks understand the business model”.

Challenges Related to the Organization: A challenge characteristic of start-ups is the limited number of employees. The company has three employees some of whom work part-time with Jonnabike. An important challenge in organizing the business is reverse logistics to deliver bicycles to customers and to recover dysfunctional bicycles. Reverse logistics related costs can be high and restrict the business to a particular territory beyond which it becomes unprofitable. There is also the need for collaboration and dependence on several third parties such as insurance companies to realise a functioning business model.

Challenges Related to the Process: The company has labour and cost intensive processes since they assemble the bicycles in-house and provide repair and refurbishment if needed. A further challenge for the company is to prove the circularity of their business model. Leasing bicycles is part of their circularity claim, however, how long their repair and refurbishment activities will prolong the life span of their bicycles is yet to be validated. Finally, due to the leasing model, the cashflow is also distributed over a long period of time which makes it challenging for the company to increase the amount of bicycles in their portfolio which requires a high upfront investment. Another challenge relates to the need to engage with customer education since customers are more used to owning bicycles. The company thus must work actively with communicating the value of their business model to potential customers.

4.3 Case 3 (Extension of Product Value) – Kamupak

The business model of this company consists of running a deposit return system for packaging of takeaway food and drinks that enables reuse of packaging containers with a high level of control and hygiene. The company views itself as delivering packaging as a service and has built a system for that. Restaurants join the system of the company and pay for a batch of reusable packaging. A customer buys food from the restaurant in the reusable packaging, pays a deposit fee and can return the packaging after use at any restaurant that is part of the system. The company has an overview of all packaging and where they currently are and charges the restaurants for each use cycle of each packaging item.

Challenges Related to the Individual(s): No challenges have been mentioned during the interview.

Challenges Related to the Environment: Restaurants are usually not used to or interested in exclusive packaging partner deals which might hamper adoption of packaging

from the start-up. Furthermore, the company states that the supplier of packaging containers has long delivery time (3–6 weeks) which slows down their expansion to include new restaurants.

Challenges Related to the Organization: One main challenge consists of overstretching of staff since they are a small team, with issues such as exhaustion and limited time of involved individuals. Since the company is still new it has had limited resources with which to increase the team. The company has little control over the production of the packaging. This implies for example long delivery times and potential challenges to increase the proportion of recycled materials in the production process. Previously collecting of used packaging and organizing of centralised washing was a big cost and challenge for the company. This has partially been managed by switching from servicing grocery stores (that required centralised washing) to only takeaway restaurants (that mostly do the washing themselves) which has diminished the logistical challenges.

Challenges Related to the Process: The company has little contact with end-users (only through their app which is optional for the end-user) and little control over the packaging when it is with the end-user. The packaging can therefore e.g., stay with the end-user instead of being returned into circulation. The choice of packaging material that the company uses (plastic) might be criticized by environmentally conscious consumers. There are other alternative packaging materials that restaurants or their customers might prefer. The company has had a lot of interest in their business and has been able to get both funding, business support, and enroll partner restaurants into their system. However, with limited resources they find it is difficult to take advantage of all that interest since they need to make contact personally with e.g., new restaurants. It has also been challenging to sort out how the system should work and understand how restaurants work with the packaging in different ways. The company has been experimenting with different ways of setting up the deposit-return system to make it work in an appropriate way. The company is interested in growing further as a platform provider for reuse but is unsure about how to organize it (e.g., through franchising or licensing) which is currently a challenge for them.

4.4 Case 4 (Facilitation of Industrial Symbiosis) – Symbios of Sweden

Symbios of Sweden is a start-up which works with mapping flows of energy and material resources in a territory to find potential synergies for industrial symbiosis. Their value proposition is to identify and facilitate collaboration for symbiotic resource use. Their target customers include municipalities and companies seeking to valorise their waste resources.

Challenges Related to the Individual(s): The start-up is newly registered (only 2 months old at the time of interviews) and thus the founder had very limited business development experience. Furthermore, certain specific competences, e.g., related to big data computations, must be sourced externally.

Challenges Related to the Environment: Legislation is also a challenge to realizing industrial symbiosis. The founder indicated that mapping resource flows often identifies several potential synergies but not all such synergies can be realised because of legal restrictions regarding the use of waste and restrictions regarding construction permits. Furthermore, some of the industrial symbiosis collaborations are new and there are no established legislations regarding how those industries should be connected and this can serve as a challenge since there are no guidelines to follow. Funding has been challenging. Financiers are often not so willing to fund a service company which does not have a tangible product. Furthermore, the founder indicated that her business activities are broad and cross-sectoral making the outcomes complex for financiers to comprehend. It is often challenging with getting potential customers to commit financial resources to symbiosis project since it is a side activity to their core business. So, even when these potential customers see the value of symbiosis, there are not always resources to commit to such activities.

Challenges Related to the Organization: The founder and CEO is the only employee in the start-up. Thus, the start-up has very limited resources. Moreover, facilitating industrial symbiosis builds on collaborations, social contacts and trust which can be resource demanding for a start-up to develop and maintain.

Challenges Related to the Process: The company's approach of mapping material and energy resource flow in a particular territory using interviews and field visits is unique for each project and adapted to the local context. Thus, the business is challenging to scale up since it is dependent on the skills and personal contacts of the founder. Also, the company must communicate actively their value addition to potential customers and be updated about their activities to be able to find potential synergies and collaborations. This is challenging for a start-up and new actors on the market.

4.5 Case 5 (Encourage Sufficiency) - Unwrapped

Unwrapped is a start-up that packages, sells and delivers high quality organic food in reusable containers as well as household items. The start-up has both an online and a physical shop together with a warehouse in Stockholm. Customers pay a deposit fee which is refunded once they return the containers. Their customers are often vegan or sustainability conscious customers who want to avoid single-use plastic packaging.

Challenges Related to the Individual(s): The interviewee expressed their need to develop more competence in new venture creation.

Challenges Related to the Environment: The founders mention that it is costly with reverse logistics since the postal service doesn't have any cost reduction for the return of empty containers from customers. This means that it can be equally as expensive to send the packaged container with food as to return the empty container. Thus, the reverse logistics is not well supported by the current charging mechanisms from the postal service. It is also challenging for the start-up to compete with larger suppliers and distributors with well-established and functioning networks.

Challenges Related to the Organization: The start-up has only two employees, i.e., the co-founders and thus very limited resources to engage in different kinds of start-up development activities.

Challenges Related to the Process: Since the business is dependent on customers engagement to return the packaging organizing the reverse logistics can be challenging for the start-up, especially when attempting to scale up. There is also a strong need for customer awareness and education to get them interested in and to engage in returning containers into recirculation. The start-up also faces challenges when it comes to establishing strategic partnerships which would enable scaling up of the business model both in terms of geographical coverage and the variety of food offerings. Such key partnerships can include for example logistics companies and food suppliers.

5 Concluding Discussion

In this paper, we have studied start-ups striving to develop circular business models to understand their characteristics and challenges. Our study shows that firms developing circular business models have many similarities with start-ups in general but also certain characteristics that makes them unique. The first observation is that start-ups developing CBMs are often experimenting with different ways to address potential customers needs with different approaches to create, deliver, and capture value based on circularity. To be considered credible and gain trust they need to validate the circularity aspects of their business model and adjust to the realities of the market's response to their concept. A second observation is that circular start-ups often operate in an ecosystem and thus may become dependent on other actors that are unable to close their material resource loops themselves. Thus, start-ups in such situations should be able to establish and maintain synergistic relations with such actors and be able to demonstrate the value of such co-dependency and seek to become irreplaceable. We have also found that, these types of start-ups often seek to create a high customer involvement in their day-to-day operations for the business model to function as intended. This implies that the circular start-ups need to invest in customer relationship management as well as develop their storytelling.

Another issue studied in this paper is what it takes to be considered a circular start-up. We have seen that these firms have a strong opportunity to experiment with different business models. What we also see is that such firms seldom have control over an entire resource loop and thus may struggle on their own to recirculate resources effectively. Consequently, their contribution to systemic changes may be limited, but they can be essential contributors to closing existing resource loops and make them more circular. Based on these observations, we define a circular start-up as a firm that strives to address an identified linear resource flow problem by experimenting with alternative solutions that can contribute to more effective resource use in closed loop systems.

Moreover, we identified several challenges that circular start-ups might face, both generic and more specifically related to circularity. The pronounced challenges include the vulnerability of such firms based on their dependency on other actors for their existence and business model to function. For some start-ups, this could mean that they are dependent on "waste" resources from other firms that can be used as input in their

production processes. This dependency is often addressed by win-win collaborations in which the start-up can help the incumbent improve their circularity while the incumbents focus on its core business. Another pronounced challenge for such start-ups is related to the challenge to scalability of circular business models due to factors such as the interdependency between several actors, cost and complexity of reverse logistics, and several other factors which are outside the control of the start-up. Another limiting factor to scalability is the existence of systems that are established and predictable and can thus limit the demand for circular solutions that might not be fully validated. Furthermore, there is also a risk of environmental rebound effects from scaling.

Based on this study, we have identified some potential future research avenues. A potential study could adopt a process approach to analyze how circular start-ups manage the different challenges they experience over time. Another potential area for a future study is the embeddedness of circular start-ups in a regional entrepreneurial ecosystem and the competence of such ecosystems to support circular start-ups. Finally, the relationship between circular start-ups and incumbents in scaling up circular business models could be an interesting research focus.

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