



Success Factors for Scaling Up and Raising Investment by Circular Entrepreneurs in Emerging Markets and Developing Economies

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Abstract

This paper sheds light on sustainability transitions in emerging markets and developing economies by analysing success factors for scaling up and raising investment by circular entrepreneurs with the use of qualitative comparative analysis (QCA). A systemic approach is adopted including internal, external, and contextual conditions. The paper provides both a theoretical contribution, in that a conceptual model of different relevant factors is presented as well as empirical validation based on a broad range of data distilled from surveys filled in by 33 entrepreneurs supported by three international projects, i.e. two by the United Nations Industrial Development Organization (Global Cleantech Innovation Programme and Private Financing Advisory Network) and one by Climate-KIC (Climate Launchpad). While three different relevant combinations of conditions have been identified for scaling up, there is no conclusive evidence of success factors for raising investment, and therefore, further conceptual and empirical work is recommended in this field.

Keywords Circular entrepreneurship · Qualitative comparative analysis (QCA) · Emerging markets and developing economies · Investment · Enterprise scale-up

Introduction

The main body of research relating to circular economy (CE) has so far evolved around its conceptualization, and the few empirical investigations that are available concern the CE implementation through businesses. Business models have in general not been recognized as an enabler for CE transitions until recently [59, 61]. Currently, there is a growing interest in how business contributes to addressing sustainability challenges, and this includes the role of entrepreneurship [10, 19]. When studies on circular entrepreneurship exist, they tend to refer to the context of developed economies. Also, they mostly focus on the factors relevant to the emergence and adoption of circular approaches. As such, the state-of-the-art literature currently contains a knowledge gap concerning empirical evidence on scaling

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up and raising investment by circular entrepreneurs in less studied emerging markets and developing economies [29, 32]. To fill in this knowledge gap, the research question to be answered in this paper is:

What are the success factors for scaling up and raising investment by circular entrepreneurs in emerging markets and developing economies?¹

To answer the research question, a multi-phased methodological approach is used, including designing a conceptual model of different relevant internal, external, and contextual factors and applying a qualitative comparative analysis (QCA). As a result, while three different relevant combinations of conditions are identified for scaling up, there is no conclusive evidence of success factors for raising investment.

Since it is one of the first papers in this thematic area, the research has an explorative character. The relevance of this research question pertains broadly to the role of circular entrepreneurs in sustainability transitions in emerging markets and developing economies. The start-ups and SMEs build a backbone of economies in these countries. They account on average for 45% of total employment and 33% of GDP, while also playing a crucial role in spurring innovation [37], and as such having a potential to significantly contribute to the development of novel solutions in response to global environmental challenges [18, 42]. Notably, regarding CE, a radical transformation in the way natural resources are used is central to meeting the Paris Agreement objectives and the Sustainable Development Goals. The extraction and processing of materials, fuels, and food accounts for about half of total GHG emissions and more than 90% of biodiversity loss and water stress. The annual global extraction of materials grew from 27 billion tons in 1970 to 92 billion tons in 2017, leading to their gradual depletion [43]. Against this background, the answer to the research question would ideally result in practical interventions directed at providing or strengthening selected success factors, to facilitate or accelerate the scaling up and raising investment by entrepreneurs, with an ultimate objective to bolster sustainability transitions.

The paper is structured as follows: in the “Literature Review and Research Gaps” section, the results of the literature review are summarized, and a research gap is identified. The “Methods” section focuses on research methods, including a description of the structure of the methodological approach and an overview of its three phases. Next, results are presented and insights into analysis are provided in the “Results and Analysis” section. Finally, the “Discussion and Conclusions” section contains a discussion and conclusions.

Literature Review and Research Gaps

Most of the research work on CE has been concerned with its formulation as a new paradigm, and there are few academic contributions dedicated to circular economy business models (CEBM). One of the most recent definitions of CE, which is also applied in this research, has been proposed by Nobre and Tavares [41]:

An economic system that targets zero waste and pollution throughout materials lifecycles, from environment extraction to industrial transformation, and to final consumers, applying to all involved ecosystems. Upon its lifetime end, materials return to either an industrial process or, in case of a treated organic residual, safely back to the

¹ According to OECD, a scale-up company is a company that has a growth of at least 20% (either in the average annualized return or in the number of employees) in the past consecutive 3 years with at least 10 employees in the beginning of the period.

environment as in a natural regenerating cycle. It operates **creating value at the macro, meso and micro levels** and exploits to the fullest the **sustainability nested concept**. Used energy sources are clean and renewable. Resources use and consumption are efficient. Government agencies and responsible consumers play an active role ensuring correct system long-term operation [41].

The blurred line between CE and sustainability might be, on the one hand, a limitation for this research, but on the other, it might also provide an opportunity to advance the current debate. This is because through the comparison of circular entrepreneurship in emerging markets and developing economies (with focus on the success factors for scaling up and raising investment) against the existing findings on sustainable entrepreneurship in general, more clarity might be acquired on the distinctive characteristics of the former.

To date, the nascent literature on CEBM has focused on establishing taxonomies to explain the dynamics of value creation and capture [2, 11, 39] as well as on analysing the value proposition and competitive advantage of CEBM [40, 58, 63] in the context of sustainability principles [15, 22, 34]. However, it is still not fully clear if the CEBM are a subset of sustainable business models and where the boundaries between circular and sustainable business models lie [13, 28, 44]. Some authors do not explicitly distinguish between conceptual models, methods, and tools for CEBM on the one hand and sustainable business models on the other. For example, Pieroni et al. [41] systematically reviewed 94 publications on business model innovation for CE and sustainability and found that the majority had focused either on CEBM or on sustainable business models, with few explicitly referring to the relations between both. The approach proposed by Urbinati et al. was the first that deviated from the Boolean *on, or off* paradigm applied so far to differentiate between linear and circular business models, in that it was based on the idea of diverse levels of circularity [17, 40, 60].

In the existing literature, it has also been acknowledged that it is often new market entrants, such as start-ups and SMEs, that adopt CEBM. They are more likely to unlock radical transformational changes, in comparison to incumbents which tend to operate under a stronger path dependency [16, 31]. According to the empirical evidence, the incumbents usually focus on adaptive solutions that enable marginal improvements in the level of circularity that are closer to the “end of pipe” such as recycling, rather than on fundamentally revisiting their business models. Start-ups and SMEs in turn implement more ambitious solutions with higher capacity for disruption, due to their higher flexibility, innovation potential, and responsiveness to market changes [8, 31, 54]. At the same time, their small size causes difficulties in raising finances as well as in benefitting from incentives [4, 14, 20]. It is noteworthy that (1) the above-outlined attempts to conceptualize CEBM rarely distinguish between new entrants (including mostly start-ups and SMEs) and incumbents and (2) the research on CEBM has so far mainly focused on developed economies [26, 27, 31, 58]. In turn, circular entrepreneurship, in particular in emerging markets and developing economies, remains a novel area of research [4, 7, 19, 31].

Regarding CEBM in developed economies, Bassi and Dias [4] analysed the CE practices applied by SMEs in the European Union (EU) with the aim of making comparisons within and between countries. SMEs in the EU were also analysed by Zamfir et al. (2017) who developed decision tree models to uncover the implementation processes of CEBM strategies at the company level and the optimal amount and nature of investments. In turn, Aranda-Usón et al. [3] focused on exploring the relationship between company size and investment in activities related to CE. The internal organizational properties of the SMEs were analysed by Katz-Gerro and Sintas [35] and proven as relevant for the choice of a CE

engagement pattern [35]. Another research stream concerns identifying barriers and enablers for SMEs to implement CEBM in the EU [51].

Regarding CEBM in emerging markets and developing economies, the few scientific contributions so far encompass for example the work of Goyal et al. (2018) that analysed the lessons learned from start-ups adopting CEBM in India, with a focus on reduce, recycle, and reuse paradigms. In turn, Jabbour et al. (2020) focused on stakeholders, innovative CEBM, and sustainable performance of firms in Brazil in the context of perseverance of institutional voids. Velenturf and Purnell [59] also refer to a CEBM in Brazil, but their analysis does not concern emerging markets and developing economies specifically. There are also some research contributions that touch upon how selected CE principles in SMEs have been applied in emerging markets and developing economies, e.g. eco-efficiency in SMEs in Venezuela [24], without mentioning CE explicitly. In turn, Moktadir et al. (2018) analysed drivers to sustainable manufacturing practices and CE in the leather industry in Bangladesh. Levänen et al., 2018 conducted a comparative study of battery recycling in Finland and Chile with the focus on the interplay between institutions and CEBM.

The importance of favourable conditions for scaling up and raising investment by entrepreneurs is widely recognized in the innovation ecosystem and system-building theory [30, 45]. For example, Urbinati et al. [58] distinguish between internal (conducted by a given organization internally) and external (conducted by a given organization in interaction with suppliers and other partners) conditions. Regarding external conditions, the role of government policies often emerges in the literature as an important topic, both in developed as well as emerging markets and developing economies [36]. The relevant role of public institutions extends beyond providing a conducive regulatory and policy environment and encompasses also the direct economic support such as for example public subsidized loans or non-repayable subsidies [1, 9, 21]. Regarding internal factors, organizational culture and leadership are deemed important [12, 49, 62]. Some researchers consider the bundles of managerial practices as a separate—neither internal nor external—factor that is being determined by the external and internal context [57].

Methods

Structure of the Methodological Approach

The methodological approach consisted of three phases, including (1) conceptual model design, (2) choice of analysis techniques, and (3) selection of the sample. Each of these phases included several steps, an overview of which is provided in Fig. 1.

Phase 1: Conceptual Model Design

In the first step, combinations of specific sets of keywords were defined to use them for a search of the most relevant journal articles in the Google Scholar engine. The sets of keywords included:

- CE/sustainability + entrepreneurship/start-ups and SMEs
- CE/sustainability + developing countries/emerging markets and developing economies
- CE/sustainability + entrepreneurship/start-ups and SMEs + developing countries/emerging markets and developing economies

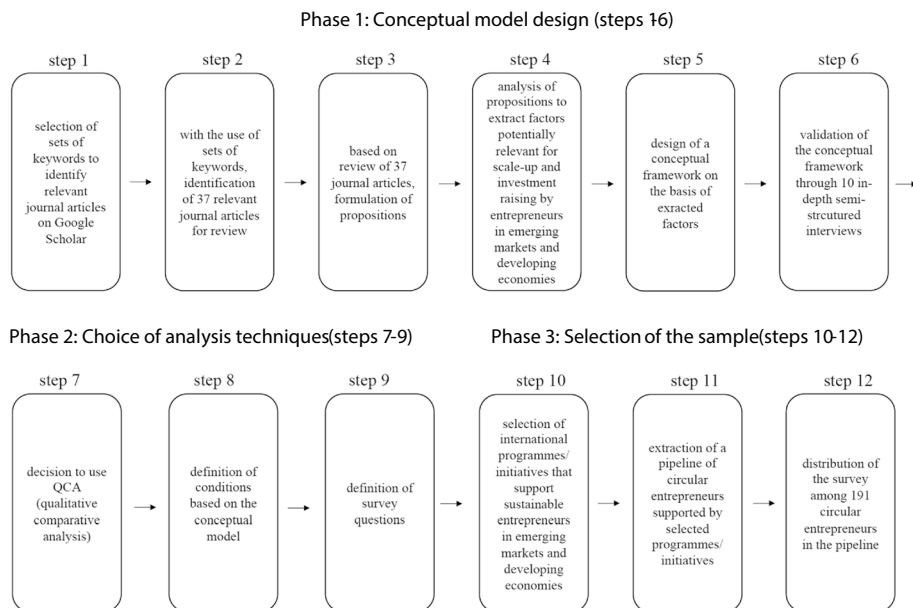


Fig. 1 Phases and steps in the methodological approach

- CE/sustainability + barriers and enablers
- CE/sustainability + barriers and enablers + entrepreneurship/start-ups and SMEs
- CE/sustainability + barriers and enablers + developing countries/emerging markets and developing economies
- CE/sustainability + barriers and enablers + entrepreneurship/start-ups and SMEs + developing countries/emerging markets and developing economies
- CE/sustainability + entrepreneurship/start-ups and SMEs + scale-up/scaling up
- CE/sustainability + entrepreneurship/start-ups and SMEs + investment
- CE/sustainability + entrepreneurship/start-ups and SMEs + scale-up/scaling up + developing countries/emerging markets and developing economies
- CE/sustainability + entrepreneurship/start-ups and SMEs + investment + developing countries/emerging markets and developing economies
- CE/sustainability + entrepreneurship and innovation ecosystem
- CE/sustainability + entrepreneurship and innovation ecosystem + developing countries/emerging markets and developing economies

In the second step, because of the search for journal articles that best match the above-listed sets of keywords, 37 journal articles were selected. Table 1 provides an overview of the coverage of analysed articles, with the view to three categories: (1) socio-economic development level of the country covered (with three variations possible: (i) only emerging markets and developing economies, (ii) only developed economies, (iii) all economies); (2) business models covered (with three variations possible: (i) only CEBM, (ii) sustainable business models, incl. CEBM explicitly, (iii) sustainable business models, not incl. CEBM explicitly); (3) company size covered (with three variations possible: (i) only entrepreneurs, i.e. SMEs and start-ups, (ii) only large companies, (iii) all companies (large and entrepreneurs)).

Table 1 Number of articles with specified coverage

Socio-economic development level, business model	Only emerging markets and developing economies	Only developed economies	All economies	Total
Only CEBM	2 (1 “only entrepreneurs”, 1 “all companies”)	19 (14 “only entrepreneurs”, 1 “only large companies”, 4 “all companies”)	6 (2 “only entrepreneurs”, 5 “all companies”)	27
Sustainable business models, incl. CEBM explicitly	1 (1 “all companies”)	1 (1 “all companies”)	0	2
Sustainable business models, not incl. CEBM explicitly	2 (2 “only entrepreneurs”)	4 (4 “only entrepreneurs”)	2 (2 “all companies”)	8
Total	5	24	8	37

As visible in Table 1, at the time of the review, only one article covered the exact scope of this research which are the CEBM of entrepreneurs in emerging markets and developing economies. Most authors focused on CEBM of entrepreneurs in high-income countries.

In the third step, the 37 selected journal articles were reviewed. The objective of the review was not to provide statistically significant conclusions, but to explore a broad array of propositions that might be pertinent to answer the research question. Since the granularity level and comprehensiveness of respective propositions are not homogenous, the exact number of propositions is difficult to determine. A full list of propositions, including the analysis described below for the fourth step, is provided in the Supplementary Information as an Excel file.

In the fourth step, the propositions were analysed to determine (1) their coverage and (2) to which factors (contextual, company external, company internal), which are potentially relevant for scale-up and investment raising in emerging markets and developing economies, they refer. Regarding the determination of coverage (point (1) above), for each proposition, it was marked to which socio-economic development level, which business model, and which company size it pertains. About (2), for each proposition, it was marked with which factors (company internal, company external, contextual) it is associated with. The contextual factors relate to aspects not directly associated with the company and/or its value chain and network, and include for example policy and regulations and macroeconomic conditions. The company external factors pertain to upstream or downstream activities along the value chain, i.e. interaction and relationship with suppliers and customers. They also concern activities across value chains, such as for example industrial symbiosis or interactions with other stakeholders such as competitors or intermediaries. The company internal factors in turn characterize the company business model, including previous experience with CE, nature of business, and company features (investment choices, strategy, etc.) as well as managerial and staff capabilities, skills, attitudes, and engagement. The internal and contextual groups of factors are broken down into several sub-factors. All of them were specified through a method of deductive-inductive coding of propositions with the use of NVivo software. Firstly, the three above-mentioned groups of factors (i.e. contextual, external, internal) were proposed deductively, and then, the more granular differentiation was undertaken inductively, based on the analysis of propositions.

Notably, the analysis of propositions did not always allow for the determination if respective factors present a dependent or independent variable. Also, it was not possible to capture the interdependence of factors as well as if they have a direct or indirect influence on scaling up and raising investment by entrepreneurs. What is more, different definitions of the same phenomena were used by various authors, and they needed to be aligned in the analysis of propositions.

In the fifth step, based on the analysis of propositions, a conceptual model was designed. In the sixth step, in order to validate the conceptual model, ten in-depth semi-structured interviews were conducted, i.e. six with international and local experts associated with institutions dealing with CE and entrepreneurship (i.e. African Circular Economy Network, Asia Circular Economy Association, Circular Influence, UNIDO, Chatham House, Climate-KIC) and four with circular entrepreneurs in emerging markets and developing economies (Chile, Panama, Viet Nam, Zambia). The latter was then further supplemented with a review of additional secondary data, including company websites and documents (if available). The interviews were conducted in English and ranged up to 1 h. They were tape-recorded, for which permission was requested at the beginning of the call, and they were transcribed afterwards. The interview responses and additional secondary data were then analysed and coded using qualitative content analysis in a deductive-inductive approach,

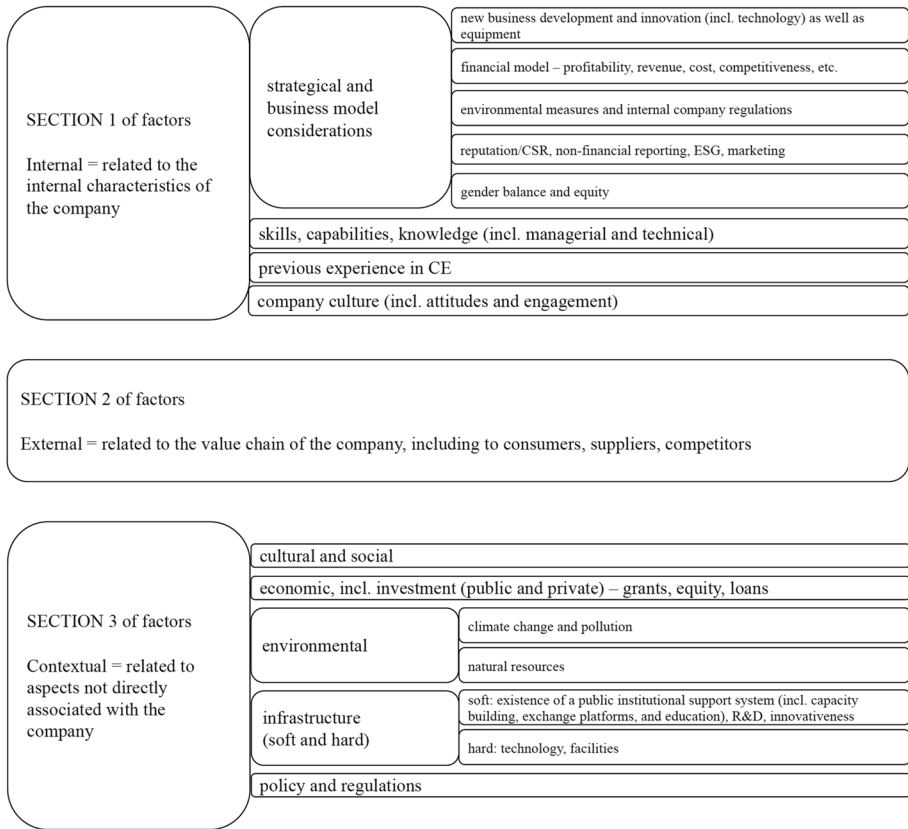


Fig. 2 Conceptual model of success factors for scaling up and raising investment by circular entrepreneurs in emerging markets and developing economies

i.e. the factors outlined in the conceptual model draft served as predefined codes, while it was allowed to add new codes, as applicable. The NVivo software was used for the qualitative content analysis. The conceptual model draft was validated, yet some factor names were revised to be more accurate and one new code was added that refers to gender and equity aspects. Also, additional dimensions of conditions to be considered for the QCA were derived. The changes against the conceptual model before validation are underlined in the relevant part of the Supplementary Information.

As a result of the six steps described above, the conceptual model was built as presented in Fig. 2.

Section 1 contains internal factors, i.e. factors related to the company’s internal characteristics. They can be further divided into sub-categories, i.e. strategical and business model considerations; skills, capabilities, and knowledge; previous experience in CE; and company culture. The first sub-category (i.e. strategical and business model considerations) can also be further divided into new business model development and innovation as well as equipment; financial model; environmental measures and internal company regulations; reputation/CSR, non-financial reporting, ESG, and marketing; and gender balance and equity. Section 2 contains external factors, i.e. factors related to the value chain of

the company, including consumers, suppliers, and competitors. This section is not further divided into additional sub-sections. Section 3 contains contextual factors, i.e. factors related to aspects not directly associated with the company. The related sub-categories include cultural and social factors; economic factors, including investment; environmental factors (with further sub-categories of climate change and pollution; natural resources); infrastructure (further sub-categorized into soft and hard); and policy and regulations. More details on the specific sections and associated propositions can be found in the Supplementary Information.

Phase 2: Choice of Analysis Techniques

Qualitative Comparative Analysis (QCA)—Introduction and Limitations

QCA is a method that offers the possibility to compare cases and assess the necessity and sufficiency of conditions in relation to an outcome [48, 53]. In other words, it makes it possible to determine how configurations of variables are associated with a particular outcome [23]. In that, it enables to empirically examine the configurational nature of causality [33, 46]. The method allows for cross-case comparisons while at the same time giving justice to within-case complexity [50]. Most studies using QCA rely on macro-level data, but there is an increasing number of contributions that focus on units of analysis at the micro or meso level (e.g. firms, households, local governments) [5]. In recent years, QCA has impressively developed, spreading across different disciplines and expanding from small and medium-N applications to large samples, while integrating both qualitative and quantitative data [56]. The growing popularity of QCA also raised questions related to good practices as well as instigated interest in the evaluation of this method, with respect to the conditions for the validity of results [6, 56].

QCA can have two forms: crisp-set and fuzzy-set. In the former, causal conditions and outcomes are coded either as absent (“0”) or present (“1”). Fuzzy-set QCA (fsQCA) follows the same fundamental logic as crisp-set QCA but normally allows for a spectrum of possible values [23]. For data that does not take value 0 or 1, there is a need for calibration that can be either manual (i.e. researchers use their expert judgement) or based on the use of algorithms [47]. The notion of calibration distinguishes fsQCA from statistical techniques which are typically based on parameters differing in value. In contrast, fsQCA is used to explore causal conditions which differ both in “kind” (present or absent) and “degree” (of presence and absence). While the focus of a regression analysis is to estimate how a dependent variable changes given an adjustment in the independent variable, the goal of the fsQCA is to conclude if the presence or absence of causal conditions and their combinations is consistent with the presence or absence of a particular outcome [23].

The QCA offers an alternative to linear regression analysis, which is commonly used for the examination of complex phenomena and causal relationships [23], as well as for in-depth case studies. In general, QCA has six main advantages, i.e.:

- 1) While it was originally designed to work with small sample sizes, far below those required for regression analysis, it can also be used for medium-sized and large samples that are too big for in-depth case studies.
- 2) QCA is suitable for identifying multiple configurations of causal conditions that are sufficient for a given outcome. Notably, a single causal condition is usually insufficient to explain the presence or absence of a particular outcome. While regression analysis

commonly refers to dependent and independent variables, implying that it is possible to isolate the effect of an independent variable on the dependent variable by changing the values of the former, in QCA, it is the joint presence or absence of a set of causal conditions that leads to a given outcome. The QCA focuses on cases rather than variables.

- 3) QCA allows for *equifinality* of different combinations of causal conditions, i.e. different configurations of causal conditions can lead to the same outcome. The standard regression analysis does not allow to discern the different pathways to the same outcome. As such, the regression analysis may fail to identify the role of a given causal condition when explaining the absence or presence of the outcome.
- 4) QCA allows for *asymmetric* solutions for the absence and presence of a given outcome, i.e. the causal conditions leading to the absence of a particular outcome do not need to be the inverse of the conditions that lead to the presence of this same outcome, which is difficult to capture in a standard regression analysis.
- 5) QCA has *no omitted variable bias*, in the same way as regression analysis does, since QCA is based on Boolean algebra rather than on correlations. While leaving out a relevant condition will decrease the explanatory power of the model, it will not result in an omitted variable bias.
- 6) QCA makes it possible to delve into additional qualitative exploration of cases, and even to conduct complementary case studies [23, 25].

Nevertheless, QCA also has some limitations in comparison to other methods, such as case studies or linear regression, i.e.:

- 1) As researchers might use their own expertise to conduct calibration in QCA, there is a risk of flawed calibration leading to distorted results.
- 2) QCA typically tests for sufficiency, but not necessity.
- 3) As the number of causal conditions increases, the results of QCA become increasingly complex and difficult to interpret. The number of possible configurations doubles with each additional causal condition.
- 4) In general, QCA is not a statistical method for hypothesis testing, as formulating hypotheses about several configurations of causal conditions is challenging.

In general, QCA aims to strike a balance between qualitative and quantitative methods, which might be particularly useful for providing sensitive policy recommendations.

Conditions and Outcomes

The relevant ten conditions were determined based on the conceptual model. The outcome is defined as company success which is evidenced either by company scale-up (i.e. raise in revenue or number of employees, with at least ten employees at the beginning, by 20% over last 3 years) or by raising investment.

In line with the determined conditions, the research question (i.e. *What are the success factors for scaling up and raising investment by circular entrepreneurs in emerging markets and developing economies?*) was transposed into the following equation:

$$\text{Outcome} = \text{condition } (1 + 2 + 3 + \dots + 10).$$

More details on the conditions and information on the corresponding survey questions are provided in Table 2.

Table 2 Conditions, outcome, and questions

	Outcome (scaling up or raising investment) =	Survey questions (Supplementary Information)	Conditions
<i>Condition 1</i>	Strategical and business model considerations, incl. gender balance and equity (internal)	Q 7–19	Internal
<i>Condition 2</i>	+ Skills, capabilities, knowledge (incl. managerial and technical) (internal)	Q 20–25	
<i>Condition 3</i>	+ Previous experience in CE (internal)	Q 26	
<i>Condition 4</i>	+ Company culture (incl. attitudes and engagement) (internal)	Q 27–32	
<i>Condition 5</i>	+ External	Q 33–38	External
<i>Condition 6</i>	+ Cultural and social (contextual)	Q 39–40	Contextual
<i>Condition 7</i>	+ Economic, incl. investment (public and private), i.e. grants, equity, loans (contextual)	Q 41–44	
<i>Condition 8</i>	+ Environmental (contextual)	n/a	
<i>Condition 9</i>	+ Infrastructure (contextual)	Q 45–49	
<i>Condition 10</i>	+ Policy and regulations (contextual)	Q 50–54	

Most of the conditions (except for condition 3) are compound variables that are measured with specific questions (that reflect the identified dimensions of a given condition) in the company survey (Supplementary Information) or are based on secondary data. Equal weights were assigned to each question (i.e. condition dimension) and to each condition. Equal weighting was pursued because the literature review and interviews did not reveal any precedence of some condition dimensions (and conditions) over others. On the contrary, all conditions and their dimensions are of similar importance. The descriptive statistics included in the Supplementary Information provide more information on the dimensions (vertical axis) that constitute the compound condition value for respective companies (company number is included on the horizontal axis). For example, for condition 1, it was possible to achieve the maximal value of 12 by adding up the equally weighted 12 dimensions. The highest result of 9.31 was achieved by company number 4, and the lowest of 3.32 by company number 27.

The proposed approach was selected for two main reasons. Firstly, there is a lack of literature that explores CEBM in a structured and systemic way, and most of the research contributions focus on case studies without “zooming out” and investigating patterns. Secondly, while there has been a lot of conceptual work done on the CEBM, the empirical studies are limited, and the geographical scope of developing countries has been neglected. This study allows to analyse the CEBM of selected entrepreneurs across several emerging markets and developing economies in a fine-grained and contextualized way, as well as to compare them and uncover differences and similarities, which allows for system-level conclusions with adequate attention to the fact that CE solutions are not universal. This will contribute to the building of a global knowledge based on how and why specific CEBM work in a given context, allowing for a better understanding of how CE transition pathways can be deliberately influenced by all relevant actors at diverse levels (micro, meso, macro).

Phase 3: Selection of the Sample

There were three programmes/initiatives used as a source of information on sustainable entrepreneurs in emerging markets and developing economies, i.e. Climate Launchpad,² Global Cleantech Innovation Programme³ (GCIP), and Private Financing Advisory Network⁴ (PFAN). All of them support start-ups and SMEs to strengthen their business models and subsequently to raise investment, while Climate Launchpad and GCIP work with more early-stage enterprises in comparison to PFAN. What is more, circular entrepreneurs are only one of the target groups of these programmes/initiatives.

The reason for relying on several (i.e. three) programmes/initiatives is twofold. Firstly, it was attempted to use non-programme or project-specific data, but to be more versatile and inclusive to avoid bias. Secondly, all the selected programmes/initiatives apply objective criteria to thoroughly screen enterprises that are further supported. This ensures the high quality of included entrepreneurs, which is relevant with the view to the high popularity of the CE concept and the associated widespread availability of funding, in response to which several proponents decide to produce business ideas and innovations that are of doubtful credibility. Nevertheless, failure is inherent to the notion of entrepreneurship. According

² <https://climatelaunchpad.org>

³ <https://www.unido.org/GCIP>

⁴ <https://pfan.net>

to a ScaleUpNation report (2020), only 0.4% of all start-ups scale, reaching more than 10 million revenues within 5 years. Also, importantly, none of the three programmes/initiatives generates demand for any specific kind of technology or business model, but they all nurture bottom-up entrepreneurial initiatives.

A pipeline of 191 circular companies (from Climate-KIC, GCIP, and PFAN) was available. The survey was sent to all companies via e-mail, including a follow-up, for around 5 weeks. Within this time, a response rate of 17% (33 companies) was achieved. The survey results made it possible to find out which of the companies are successful, i.e. the QCA outcome is defined as company success which is evidenced either by company scale-up (i.e. raise in revenue or number of employees, with at least ten employees at the beginning, by 20% over last 3 years) or by raising investment. The 33 survey respondents represent a wide variety of companies with different geographical locations, as outlined in Table 3.

Also, a multiplicity of circular economy business models was featured in the survey responses, covering both biological and technological cycles as well as various stages across the waste management hierarchy. All this implies high diversity and context specificity of data gathered.

Results and Analysis

A study by Marx (2006) outlines the threshold for the minimum number of cases needed per number of independent variables in fsQCA. Accordingly, to test five variables in an empirically significant way, a minimum of 15 responses are required. As the survey resulted in 33 responses, the threshold for testing five variables is fulfilled.

In the first step, secondary data was identified in cases where the condition dimensions were not covered by the survey (e.g. condition 8—environmental factors). Next, the Tosmana⁵ software was used to calibrate the data, followed by the tests of necessary conditions in the fsQCA software. It turned out that no single conditions are necessary to achieve the outcomes. In the next step, several truth table algorithm [47] analyses were run to find the combinations of five conditions that lead to the outcome. More specifically, the intermediate solutions revealed in the truth table analyses in the fsQCA software were taken into consideration to determine the viable combinations of conditions.

Outcome 1: Company Scale-up

In total, 25 companies scaled up and they are based in 17 different countries, i.e. Armenia, Burkina Faso, Egypt, Ghana, India, Indonesia, Malaysia, Mauritius, Nigeria, Pakistan, Panama, Philippines, South Africa, Tanzania, Turkiye, Uganda, and Zimbabwe. The results show that neither the fulfilment of all proximate conditions alone nor of all remote conditions alone leads to the company scale-up. The model in which all remote conditions are fulfilled, without any proximate conditions fulfilled, results in a solution coverage of 0.2868, meaning that only around 29% of cases with the desired outcome feature the given combination of conditions, and the consistency of 0.841549, which means that of those 29%, around 84% are consistent with the model. The model in which all proximate conditions are fulfilled, without any remote conditions fulfilled, results in a solution coverage of

⁵ <https://www.tosmana.net>

Table 3 Overview of geographical coverage of survey responses¹

Country	Country classification (World Bank, 2020)	Number of respondents
Armenia	Upper middle-income	1
Burkina Faso	Low-income	1
Egypt	Lower middle-income	1
Ghana	Lower middle-income	1
India	Lower middle-income	4
Indonesia	Lower middle-income	1
Kenya	Lower middle-income	1
Malaysia	Upper middle-income	1
Mauritius	Upper middle-income	1
Nepal	Lower middle-income	1
Nigeria	Lower middle-income	3
Pakistan	Lower middle-income	5
Panama ²	Upper middle-income	1
Peru	Upper middle-income	1
Philippines	Lower middle-income	1
South Africa	Upper middle-income	3
Tanzania	Lower middle-income	1
Turkiye	Upper middle-income	1
Uganda	Low-income	1
Uzbekistan	Lower middle-income	1
Zambia	Low-income	1
Zimbabwe	Lower middle-income	1
Number of different countries: 22		Total number of respondents: 33

¹The analysis encompasses emerging markets and developing economies (i.e. no developed economies), as defined by MSCI. Also, a classification into low- and middle-income countries according to the World Bank in 2020 was provided for a better overview of the country's development status

²Please note that (1) the country classification fluctuates over years between upper middle-income and high-income (it became high income in 2018, then was reclassified into middle-income, after which it again became high-income in 2021) and (2) the relevant circular entrepreneur based in Panama started and developed his business activity when Panama was a middle-income country

0.6168, i.e. around 62% of cases with the desired outcome feature the given combination of conditions, and the consistency of 0.907593. While the latter model explains a larger portion of cases, the coverage is still relatively low.

There have been three models identified that explain nearly 70% of cases and are therefore regarded as viable. Accordingly, to achieve the company scale-up, there is a need to fulfil all company internal conditions (conditions 1, 2, 3, and 4) simultaneously, in combination with a contextual condition, namely either condition 7, or condition 9, or condition 10. Figure 3 shows a diagram of the three paths (models) for achieving company scale-up (Table 4).

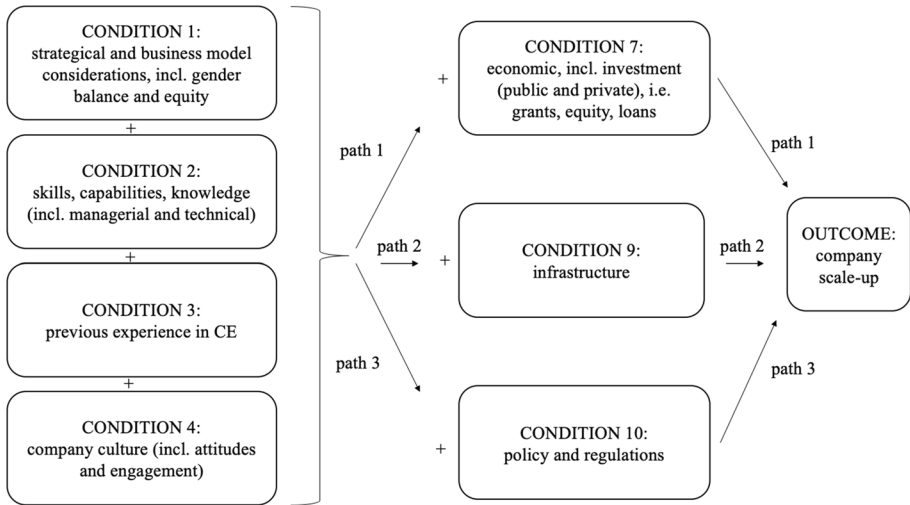


Fig. 3 Three paths (models) to achieving the company scale-up

Table 4 Consistency and coverage of three paths leading to the company scale-up

Path number	Consistency	Coverage
1	0.894118	0.6992
2	0.905159	0.6948
3	0.888715	0.6804

The simultaneous fulfilment of all internal conditions (1, 2, 3, 4) is necessary yet not sufficient for company scale-up. It must be accompanied by one of three conducive contextual conditions, i.e. either economic, or infrastructure, or policy and regulations. At the same time, the fsQCA analysis revealed that the cultural and social considerations or the environmental ones are less relevant contextual conditions for company scale-up, in combination with the internal conditions fulfilled simultaneously.

According to the results, even in countries with weak infrastructure, a company scale-up is possible if the company has strong internal characteristics and either the economic contextual factors or the policy and regulations are conducive. Equally, the absence of favourable policy and regulations does not necessarily prevent the company scale-up, provided that either the infrastructure or economic conditions in the country are good along with the fulfilment of the internal company conditions. In turn, when the economic situation in the country is bad, either the conducive policy and regulations or the infrastructure can make up for it and enable a company scale-up in case the internal company conditions are fulfilled.

Outcome 2: Investment Raised

The results concerning success factors for raising investment were not as conclusive as those for scaling up. Among the different combinations of five variables that were tested, most of them exhibit low coverage, i.e. they explain a small number of cases ranging from below 1% to around 30% of the sample for most models. The highest coverage that was achieved for some combinations oscillates around the level of 40%, which means that the models explain 40% of the sample (which equals around 13 out of 33 cases). Yet, this occurs with a high consistency of around 90%. Therefore, it can be concluded that the success factors for raising investment are in general highly case specific. However, in all the four combinations with the highest coverage, an interplay of different internal, external, and contextual factors was needed to raise investment. As a result, it can be claimed that the internal, external, and contextual conditions are equally important for achieving the best-working combinations of conditions. Four combinations of conditions with the highest coverage are presented in Table 5.

The companies (in total 20) that raised investment are based in 16 different countries, i.e. Armenia, Egypt, India, Indonesia, Mauritius, Nepal, Nigeria, Pakistan, Panama, South Africa, Tanzania, Turkiye, Uganda, Uzbekistan, Zambia, Zimbabwe. It is possible that a two-step fsQCA (please see Supplementary Information) could deliver more conclusive results for the success factors for raising investment.

Discussion and Conclusions

To facilitate the discussions of results, the Context-Mechanism-Outcome framework, which is a tool derived from the realist evaluation of complex social phenomena, is applied. More specifically, the configurations of different conditions are critically analysed with the view to understanding “what works, how, in which conditions and for whom” rather than if they work or not. The Context-Mechanism-Outcome framework helps discern complex social phenomena through the disaggregation of the concept of mechanism and consideration of this concept as a continuum rather than an “on/off switch”.

Regarding outcome 1 (scaling up), the combinations of 7 out of 10 different conditions were relevant. These conditions are again listed in Table 6.

As explained earlier, the conditions are mostly compound variables consisting of several dimensions that are reflected in respective company survey questions. The only exception is condition 3, i.e. previous experience in circular economy. It was decided to keep this condition separately, since the literature review and interviews revealed its importance and, at the same time, previous experience in CE did not fit logically as a dimension of any other condition. Noteworthy, the research results confirmed that previous experience in CE, along with other internal company characteristics, plays a crucial role in scaling up. This points to the critical function of learning and experimenting in CE for achieving the company scale-up.

Also, in general, the research results confirm the finding of Jabbour et al. (2020) that the internal company characteristics might be stronger barriers/motivations than the external/contextual ones in emerging markets and developing economies. According to this research, while the government policy and regulations might be conducive to circular entrepreneurship, they are not necessary. This also confirms the results of Jabbour et al.

Table 5 Consistency and coverage of combinations of conditions for investment raised

Condition combination	Consistency	Coverage
Condition 1 (internal) + condition 2 (internal) + condition 3 (internal) + condition 9 (contextual) + condition 10 (contextual)	0.909285	0.426
Condition 1 (internal) + condition 2 (internal) + condition 6 (contextual) + condition 9 (contextual) + condition 10 (contextual)	0.875527	0.415
Condition 2 (internal) + condition 3 (internal) + condition 5 (external) + condition 6 (contextual) + condition 9 (contextual)	0.888044	0.4085
Condition 1 (internal) + condition 3 (internal) + condition 4 (internal) + condition 5 (external) + condition 6 (contextual)	0.90919	0.4155

Table 6 Conditions most relevant for scaling up (in different condition combinations)

Outcome (scaling up) =	Survey questions (Supplementary Information)	Dimensions (Supplementary Information)
<i>Condition 1</i> Strategic and business model considerations, incl. gender balance and equity (internal)	Q 7–19	<ul style="list-style-type: none"> ■ Intense pressure of the company owners and/or shareholders to adopt CEBM ■ Strong internal innovation within company ■ Ownership of crucial equipment ■ Business model based on strong external relations ■ Strong (quality and/or quantity) own financial company resources ■ Utilization of public financial support to start business ■ High and difficult to gather upfront CEBM investment costs ■ Investment of part of company turnover in R&D ■ Existence of ISO 14001/9001 certification within company ■ Strong company reputation ■ Existence of non-financial reporting ■ Existence of ESG standards and/or frameworks ■ Engagement in communications and marketing ■ Share of female employees ■ Share of women in management positions
<i>Condition 2</i> + Skills, capabilities, knowledge (incl. managerial and technical) (internal)	Q 20–25	<ul style="list-style-type: none"> ■ Strong technical knowledge of the company staff ■ Strong technical knowledge of the company management ■ Good managerial skills ■ Strong business skills of the company staff ■ Strong business skills of the company management ■ Good networking and relationship-building skills within the team
<i>Condition 3</i> + Previous experience in CE (internal)	Q 26	n/a

Table 6 (continued)

Outcome (scaling up) =		Survey questions (Supplementary Information)	Dimensions (Supplementary Information)
<i>Condition 4</i>	+ Company culture (incl. attitudes and engagement) (internal)	Q 27–32	<ul style="list-style-type: none"> ■ Effective communication across the company ■ Strong coordination and integration across the company ■ Strong company management determination and commitment to CE ■ Strong determination and commitment of the company staff to CE ■ Strong social capital and business network of the company ■ Minimal risk aversion within the company
<i>Condition 7</i>	+ Economic, incl. investment (public and private), i.e. grants, equity, loans (contextual)	Q 41–44	<ul style="list-style-type: none"> ■ Limited access to / availability of external private financial resources – grants, equity, loans ■ Limited access to / availability of external public financial resources – grants, equity, loans ■ Popularized innovative financial instruments, such as peer-to-peer and crowdfunding ■ Strong demand-pull for CE products/services ■ Strong economy stability (i.e. absence of economic crisis)
<i>Condition 9</i>	+ Soft and hard infrastructure (contextual)	Q 45–49	<ul style="list-style-type: none"> ■ Presence of an external reference point to which SMEs can turn for support (e.g. capacity building support, supportive media, platforms) ■ Existence of formal CE education programmes ■ R&D public spending ■ High economy innovativeness (Innovation Index) ■ Availability of technology ■ Well-developed and accessible CE-related facilities (e.g. recycling infrastructure and infrastructure for separate waste collection) ■ Well-developed public institutions

Table 6 (continued)

Outcome (scaling up) =	Survey questions (Supplementary Information)	Dimensions (Supplementary Information)
<i>Condition 10</i> + Policy and regulations (contextual)	Q 50–54	<ul style="list-style-type: none"> ■ Conducive CE policy and regulations ■ Strong enforcement regime ■ Export to countries with tighter policy/regulations ■ Significant role of green public procurement ■ High administrative burden related to CE practices

Table 7 Conditions least relevant for scaling up (in different condition combinations)

	Outcome (scaling up or raising investment) =	Survey questions (Supplementary Information)	Dimensions (Supplementary Information)
<i>Condition 5</i>	+ External	Q 33–38	<ul style="list-style-type: none"> ■ Strong company client awareness about CE ■ CE pressure/demands from consumers ■ CE pressure from suppliers ■ CE pressure from competitors ■ CE pressure from environmental organizations and/or society at large ■ Existence of X-helix partnerships and networks along and between value chains ■ Existence of intermediaries/orchestrators (i.e. actors that break through interdependencies that lock-in sustainable practices) ■ Good process/product traceability along the entire value chain
<i>Condition 6</i>	+ Cultural and social (contextual)	Q 39–40	<ul style="list-style-type: none"> ■ Existence of external CEBM recognition (award, prize, favourable tendering criteria) ■ Acute social and/or economic problems in the country that divert attention from environmental concerns ■ High CE awareness in the society and high society pressure on CE and/or environmental issues
<i>Condition 8</i>	+ Environmental (contextual)	n/a	<ul style="list-style-type: none"> ■ Adverse climate change impacts (current or possible) ■ GHG emissions ■ High pollution in the country ■ Domestic material extraction (DE) ■ Material productivity (GDP/DE) ■ DE/capita

(2020) and contradicts those by Govindan and Hasanagic [29] or Fernández-Viñé et al. [24].

Noteworthy, three out of ten conditions seem to be less relevant for scaling up. They are listed in Table 7.

It might be particularly interesting that the external factors (condition 5), i.e. those related to the value chain of the company (e.g. consumers, suppliers, partners), are not relevant for scaling up in combination with other conditions. As explained earlier, a particular characteristic of CEBM is that they often extend beyond the boundaries of a single organization, in that they require coordinated efforts along and between value chains [38, 52, 55]. As a result, the company value creation is a process in which several stakeholders take part and from which they might benefit. Yet, according to the research results, strong external factors are not necessary for a company scale-up. Nevertheless, it must also be noted that the company survey focused mostly on the scope of different collaborations and partnerships, but not on their quality. The quality aspect and its relevance for scaling up might be a topic worth further exploration in future research.

Also, the social aspects (condition 6), such as for example the CE awareness in society, in combination with other conditions, do not play a significant role in the company scale-up. Similarly, the environmental aspects (condition 8), such as for example the climate change or natural resource use characteristics of the country, in combination with other conditions, seem to be irrelevant in driving the company scale-up. While progressing climate change and scarce natural resources might be the reasons encouraging the emergence of circular approaches as remedies, they do not seem to play a significant role in accelerating the scale-up of circular entrepreneurs.

Regarding outcome 2 (raising investment), the inconclusiveness of the one-step fsQCA analysis results enables a recognition that the conditions for raising investment are highly case specific. Also, it must be underlined that this research focused on the supply side of the investment, i.e. on the companies that receive investment. Yet, the demand-side characteristics are equally important, i.e. it is also crucial to understand the decision-making processes, including criteria for the assessment of investment opportunities, applied by the investors. Future research on the latter could either corroborate the results of this research, i.e. also prove that the investment decisions are highly case specific or provide some new insights from the investor perspective into the conditions that successfully drive investment. Noteworthy, the companies analysed in the framework of this research (start-ups and SMEs in emerging markets and developing economies) require specific kinds of early-stage investment, such as for example challenge funds, venture capital, or blended finance.

In conclusion, the research results revealed that the scale-up of most of the investigated companies requires a simultaneous fulfilment of all internal company conditions that were included in the analysis:

- Condition 1: strategical and business model considerations, incl. gender balance and equity
- Condition 2: skills, capabilities, knowledge (incl. managerial and technical)
- Condition 3: previous experience in CE
- Condition 4: company culture (incl. attitudes and engagement)

Yet, the simultaneous fulfilment of the above-listed internal company conditions is not sufficient for scaling up. The internal company conditions must be complemented by one of three contextual conditions, i.e. either economic, or infrastructure, or policy and regulations, to enable a company scale-up.

Regarding investment raising, it can be deduced that the success factors are highly case specific. Yet, the research revealed that a combination of various kinds of conditions, including internal, external, and contextual, must occur to enable a circular entrepreneur to raise investment. Also, it might be concluded that it would be useful to analyse the investment decision-making processes related to circular entrepreneurs in emerging markets and developing economies in the future research to gain a demand-side perspective on the investment process. By complementing the supply-side perspective that was the research's focus, this would enable further findings. What is more, there might be a need to further engage in conceptual work on the success factors for raising investment by circular entrepreneurs in emerging markets and developing economies. As outlined in Table 1, most current theoretical contributions do not specifically concern CE (as opposed to sustainability in general), start-ups and SMEs, and emerging markets and developing economies at the same time.

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Data Availability The collected data is available upon request.

Declarations

Conflict of Interest The authors declare no competing interests.

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