

The role of social start-ups in entrepreneurial behaviour: the search for efficiency

Start-ups' role
in entrepreneur
behaviour

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Abstract

Purpose – In a world where sustainability is a major aim at all socioeconomic levels, social entrepreneurship plays an important role in achieving the goals that have been set. The purpose of this study is to broaden the knowledge of social start-ups, social incubators and founding teams, highlighting the value of each one. The aim is to use quantitative analysis to determine the possible link between social incubators and social start-up success and identify the founding team profile of social start-ups from each sector according to a sector-based ranking.

Design/methodology/approach – Bootstrap data envelopment analysis (DEA) was used to calculate the efficiency of social incubators and social start-ups and thus quantify the impact, in terms of increased efficiency, of social incubators on social start-ups. Then, using cross-efficiency methodology, a synthetic index was used to analyse the founding team profile of social start-ups. The study is based on primary data from a survey of Spanish social incubators and social start-ups.

Findings – The study provides strong quantitative evidence of the positive effect of social incubators on the development of social start-ups. The size of this effect exceeds the know-how of start-ups. In terms of efficiency gains, this research quantifies the impact of social incubators on this entrepreneurial ecosystem. This impact exceeds 35%. The study also shows that the strongest social start-ups are in the food and information and communication technology (ICT) sectors. The founding teams in these cases have a strong business background, have a high educational level, receive subsidies and express a desire to retain control of the company.

Originality/value – There is an extensive literature dedicated to the analysis of the behaviour and characteristics of traditional incubators, accelerators and start-ups. However, despite the recent rise of social entrepreneurship, studies of social incubators and social start-ups remain scarce. This study provides two novel findings. (1) It shows the importance of creating a social start-up in a context where it receives support throughout all its development stages, providing quantitative insight into the contribution of social incubators and social start-ups. (2) It reveals the profile of founding teams in the highest-ranked business sectors.

Keywords Decision making, Entrepreneurship

Paper type Research paper

1. Introduction

Start-ups seek to lead the market in the short term by offering novel products to an often unprepared audience. Accordingly, a large number of start-ups fail. Specifically, 90% do not survive for more than three years. A lack of knowledge of target customers, low level of liquidity and unsuitable team are common causes of failure highlighted in post-mortem analyses (CBINSIGHTS, 2021; Joseph *et al.*, 2023). There are considerable questions around the cause–effect relationship in this context. The failure of others should serve as a lesson to correct possible issues and avoid future closures (Eisenmann, 2021).

Start-ups should not simply be classified as small and medium-sized enterprises (SMEs), despite their size in their early stages (Ahmed *et al.*, 2021). They stem from an innovative idea, driven by the skills of the founding team. The ultimate goal is to launch a product or service



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that awakens widespread interest amongst consumers and quickly capture a high market share. This rise must be accompanied by venture capital to enable the start-up to turn this incipient idea into a well-renowned high-value company (Durand and Mulcair, 2023).

In recent decades, the concept of social entrepreneurship in this business ecosystem has developed rapidly. It has spread across all levels of the economy, achieving a high degree of representativeness (Saebi *et al.*, 2018; Luc *et al.*, 2022). Social entrepreneurship consists of discovering business opportunities aimed at responding to social, cultural or even environmental problems (Bozhikin *et al.*, 2019; Yoruk *et al.*, 2022). Using conventional market strategies, social entrepreneurship goes beyond profit maximisation. It brings together innovation and sustainable development to exert a positive impact on society (Al-Qudah *et al.*, 2022; Khan *et al.*, 2022).

It is sometimes confused with non-profit organisations. However, it is in fact a broader concept. It is classed as a business technique applied by all kinds of companies. Social start-ups are gaining ground, enhancing both the human and business sides of their activities (Hussain *et al.*, 2022). This novel business structure aims to develop a product or service by offering innovative solutions to meet people's basic needs (Salamzadeh *et al.*, 2017). According to Lamperti *et al.* (2023), this business model is built to meet the environmental and social challenges of the 21st century. The European Union is taking a leading role in promoting and implementing policies to combat climate change and ensure environmental sustainability. This approach creates opportunities for technological development and entrepreneurship (Zuazua Ruiz *et al.*, 2023). Social entrepreneurs also feature prominently in war situations such as the Russian-Ukrainian war (Kuckertz *et al.*, 2023).

Start-ups have driven the development of incubators and accelerators. These organisations offer advisory services to entrepreneurs. They nurture business ideas by providing learning, coaching, mentoring and other services to help ventures mature (OECD, 2019). The boundaries between incubators and accelerators sometimes become blurred, given the intense activity during the nascent stage of firms. However, there are conceptual differences. For example, incubators support the go-to-market of innovative ideas (Hausberg and Korreck, 2020). In contrast, accelerators aim to speed up the growth of more developed ventures that may have already entered the market (Crisan *et al.*, 2021; Mohammadi and Sakhteh, 2023). In short, accelerators continue along the path initiated by incubators, seeking the stability of the business (Tripathi and Oivo, 2020). Hence, these two concepts are combined in the analysis of social start-ups.

The scientific community has developed a broad literature on the impact of traditional incubators and accelerators. In contrast, studies of the role of incubators and accelerators in relation to social start-ups are scarce (Yang *et al.*, 2020). According to Sansone *et al.* (2020), social incubators are as efficient as traditional ones, even though their aims go beyond the purely financial. The original denomination is attributed to Aernoudt (2004), who focussed on their mission in helping people with low labour skills. Later, Sonne (2012) and Casasnovas and Bruno (2013) extended the concept to include all organisations oriented towards supporting entrepreneurs who seek innovative solutions to social challenges. Currently, it is hoped that incubators will drive the sustainable transformation of the economy by fostering firms that can meet the Sustainable Development Goals, commonly abbreviated to SDGs (Karahan *et al.*, 2022). This research is framed in a context where entrepreneurship is aligned with the 2030 Agenda. The aim of this research is twofold: (1) to provide a quantitative assessment of the possible link between social incubators and the success of social start-ups, (2) to determine the profile of founding teams that ensures the efficiency of these social enterprises. Both aspects have yet to be studied in the literature. Using data gathered from questionnaires completed by Spanish social start-ups in 2022, the study aims to answer two research questions:

- Q1. What is the impact of social incubator efficiency on the development of social start-ups?

Q2. Is the potential of social start-ups conditioned by the profile of the founding team?

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To answer these two research questions, a variant of data envelopment analysis (DEA) was used. This variant is called bootstrap DEA, which overcomes the potential weaknesses associated with the use of survey samples. The application of this technique therefore enabled effective quantification of the efficiency of social incubators and social start-ups. Primary data can sometimes be biased and can contain outliers. This situation is best resolved with resampling techniques such as bootstrapping. Another method used in this study, cross-efficiency, enabled the construction of a synthetic index to rank the analysed social start-ups. Their position in the ranking was then linked with certain entrepreneur characteristics.

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Recent studies in this area have focussed on specific aspects of social start-ups. These studies have led to a theoretical framework for this kind of enterprise. Key elements are the impact of intellectual property rights (Hirschmann and Block, 2022), social accelerators as a support system for social start-ups (Salamzadeh *et al.*, 2018), factors enhancing the development of social start-ups (Fiofanova, 2020) and the role of social incubators in the creation of sustainable value (Giordano *et al.*, 2021). This research fills the gap in the literature by making two novel contributions. (1) It offers quantitative assessment of the contribution of social incubators to the efficient development of social start-ups. (2) It describes the profile of founding teams that ensures the efficiency of these new companies. Education occupies a prominent role. This research enriches knowledge of the entrepreneurial ecosystem of social start-ups. In this context, this type of assessment is scarce. It provides evidence of the importance of firms created under the guidance of specialised organisations such as social incubators. The results confirm the value provided by incubators and the importance of factors such as education and subsidies in ensuring the success of social start-ups.

The paper has the following structure. Section 2 provides a literature review to build a conceptual framework for the study. Section 3 describes the method and variables. Section 4 presents the results of the empirical analysis and discusses the existing paradigm. Section 5 offers conclusions and highlights some of the limitations of the study.

2. Literature review: conceptual framework

The birth of a start-up takes place in different stages. The needs at each stage are difficult to meet internally. Therefore, the help of actors such as customers, suppliers, incubators and universities is important. This universe of interrelationships and processes is known as an innovation ecosystem (Ander and Kapoor, 2010; Vascocencos-Gomes *et al.*, 2018; Granstrand and Holgersson, 2020). According to Marcon and Duarte-Ribeiro (2021) start-ups need support from market-oriented and other innovation ecosystem actors during the creation, development and commercialisation stages. This support is in addition to other social and organisational resources.

In this context, intrapreneurship should not be confused with entrepreneurship. Both are driven by innovative actions, but there is a major conceptual difference. Intrapreneurship takes place within an established firm. In contrast, entrepreneurship, which encompasses start-ups, refers to the creation of new ventures as a channel for innovation. Start-ups are nurtured in collaborative research and development (R&D)-based habitats that are open to alliances between finance providers, research centres and firms (Moskovicz, 2021). Figueredo-Rocha *et al.* (2019) described the complexity of the innovation ecosystems of start-ups as a strategic asset that is attractive for venture capital. Scholars broadly agree on the need to support innovation and knowledge aiming to cover gaps in the market to ensure economic and social sustainability and regional development (Odriozola-Fernández and Berbegal-Mirabent, 2020; Kraus *et al.*, 2022; Rosli and Cacciolatti, 2022).

Social incubators offer advisory services to entrepreneurs. Their mission is to encourage the birth of sustainable firms that respect the environment whilst promoting economic growth (Baskaran *et al.*, 2019). Depending on the phase of the social start-up, social incubators can offer

training, access to finance and contact networks to generate potential opportunities. They have become crucial to foster sustainability by encouraging the creation of social start-ups (Lamperti et al., 2023). Their support in the early stages of firm development usually has high-potential cumulative effects (Silva et al., 2022). However, they must also adapt to the economic context. For example, in Africa, social entrepreneurs gain basic business concepts from these organisations. This grounding is of huge value for their innovative ideas and entrepreneurial development, given the lack of specific learning needed for a social orientation (Bucci and Marks, 2022). In systems of technology entrepreneurship, other intermediaries should complement social incubators. These intermediaries offer entrepreneurs services and help create networks tailored to the specific requirements of the sector (Ho and Yoon, 2022). The scientific community has provided a wealth of research to contextualise the importance of social incubators and the profile of the founding team. However, some issues require more detailed analysis, as addressed in this paper (Table 1).

	Conclusions	Research gap
<i>Q1. What is the impact of social incubator efficiency on the development of social start-ups?</i>		
Fernandes <i>et al.</i> (2019)	Social incubators must enhance their “sustainable version” to ensure social and environmental management	The literature supports the praxis of social incubators as sustainable value creators. However, a quantitative assessment of their contribution to the growth of social start-ups is needed
Sansone <i>et al.</i> (2020)	Social incubators are efficient in the economic growth of start-ups	
Giordano <i>et al.</i> (2021)	A theoretical framework for understanding the sustainability of social incubators is provided	
Valero <i>et al.</i> (2021)	Political orientation and revenue dependency condition the performance of social incubators	
Hirschmann <i>et al.</i> (2022)	Social duty is the primary motivation for social incubators	
Bucci and Marks (2022)	In developing countries, there is a need for a closer approach to social entrepreneurship	
<i>Q2. Is the potential of social start-ups conditioned by the profile of the founding team?</i>		
Walske <i>et al.</i> (2018)	Founders of social enterprises tend to have more experience in the governance and management of social start-ups, with similar levels of senior management and consulting experience as founders of traditional venture capital firms	A broad stream of literature supports the importance of the profile of the founding team. The proposal in this research is that it is associated with social start-ups’ efficiency to detect the aspects that determine their success
Fiofanova (2020)	Leaders of social start-ups should have competencies in building institutional change	
Block <i>et al.</i> (2021)	Investors consider the social background of the founders to be highly relevant to identify the population’s problems	
Sanchez-Robles <i>et al.</i> (2023)	The founding partners of social start-ups need to be better prepared to ensure successful development	
Tsurayya <i>et al.</i> (2023)	Financial health, equity and social justice are critical issues for the co-founders of social start-ups	
Kher <i>et al.</i> (2023)	The impact of the founders’ gender on the development of social start-ups is analysed, with the use of mixed-gender teams providing the best option	

Source(s): Authors’ own creation

Table 1.
Contextualisation of
research

To enhance social entrepreneurship, higher education institutions increasingly offer on-site support and guidance services to potential entrepreneurs. They provide financing and support for perfecting innovative ideas within the university community (Angrisani *et al.*, 2023). The level of engagement depends on the entrepreneurial profile of the university (Redondo and Camarero, 2019). Miranda and Borges (2019) called on university professors to help. Together with the incubator, they can provide knowledge to enable task and responsibility allocation, which is one of the primary causes of failure for start-ups. Ripollés and Blesa (2023) found evidence that entrepreneurship education has learning outcomes in terms of students' undertaking of innovative actions. The involvement of educational institutions is essential for future entrepreneurs to develop a sustainable attitude (Dixit *et al.*, 2023; Mwenda *et al.*, 2023; Nikou *et al.*, 2023). Solomon *et al.* (2019) noted the growing interest in social entrepreneurship education. Future trends include greater involvement by higher education institutions.

Fernandes *et al.* (2019) reported the need for greater commitment from social incubators. Environmental certification can ensure their alignment with the SDGs. The notion that these organisations choose ideas with the highest chances of success is important. The profile of entrepreneurs can play a decisive role (Capatina *et al.*, 2023). Hirschmann *et al.* (2022) found evidence of the role of authenticity in the founding team and social duty as discriminatory criteria for incubators. Direct, agile communication between members is required when the team is small (González-Cruz *et al.*, 2020). Human capital is essential to ensure the survival of start-ups. Powerful and well-functioning founding teams increase the success rate of nascent ventures (Miller and Pätzmann, 2023). Their role is so crucial that, on occasions, contradictory results have been observed in relation to the influence of incubators on start-up survival. Blank (2021) highlighted the need for the joint assessment of the value of the founding team and the resources offered by incubators in order to determine the survival of start-ups. Maughan (2023, p. 1) showed that, "in giving meaning to the concept of sustainability, organisational actors can draw on their organisation's identity and construct the comprehensibility of an organisational sustainability programme".

3. Method and data

The study aims and sample features meant that bootstrap DEA was suitable to examine the link between the efficiency of social incubators and social start-ups. Cross-efficiency was also used to construct a synthetic indicator and thus obtain a ranking of sectors for all observations. This approach enabled analysis of those with the highest ranking (Figure 1). The data required to apply both methods were gathered from a survey of the founding teams of Spanish social start-ups.

3.1 Method

DEA is a non-parametric mathematical optimisation method. Based on decision-making units (DMUs), an efficient frontier of production is constructed. Using linear programming, the outputs are maximised based on the available inputs (output orientation). Alternatively, the resources required to obtain a desired output are minimised (input orientation). This process requires the determination of the optimal weights. In other words, it requires the

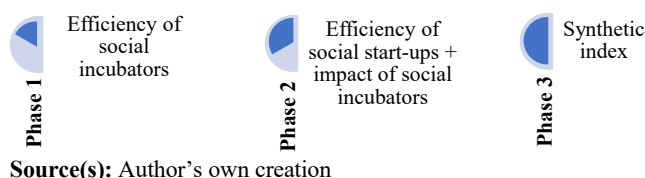


Figure 1.
Phases of analysis in
the present study

weights whose distance between the efficient frontier and the observed DMU are minimal. The primary advantage of this method is its flexibility given its non-parametric nature. Accordingly, it does not require the specification of the production function. It was originally developed by [Charnes et al. \(1978\)](#) under the hypothesis of constant returns to scale. [Banker et al. \(1984\)](#) loosened this restriction, allowing independent variation of the inputs and outputs under variable returns to scale. Despite its widespread acceptance in the literature ([García-Mollá et al., 2022](#); [Puertas et al., 2022](#); [Pérez-Zabaleta et al., 2022](#)), DEA still has certain limitations. It is a statistical tool whose results are highly sensitive to variability in the sample, data quality and the presence of outliers ([Herrera and Pang, 2005](#)). To overcome these weaknesses, [Simar and Wilson \(2000, 2008\)](#) proposed bootstrap DEA to construct the empirical distribution for the efficiency estimators. The steps of the procedure are as follows ([Tziogkidis, 2012](#)): (1) calculate the efficiency scores using DEA; (2) draw with replacement from the empirical distribution of efficiency scores; (3) divide the original efficient output levels by the pseudo-efficiency scores drawn from the empirical distribution to obtain a bootstrap set of pseudo-outputs; (4) apply DEA using the new set of pseudo-outputs and the same set of inputs and calculate the bootstrapped efficiency scores; (5) repeat steps 1 to 4 numerous times and use bootstrapped scores for statistical inference and hypothesis testing. [Simar and Wilson \(2000\)](#) recommended 2000 repetitions.

The features of the present study led to the choice of bootstrap DEA under the hypothesis of variable returns to scale and output orientation. The level of efficiency for each of the DMUs may be greater than or equal to 1. The amount by which it exceeds 1 represents how much the outputs must be increased to be completely efficient. The efficiency score corresponds to the inverse of the level of efficiency. Hence, it lies in the interval 0 to 1.

DEA identifies the efficient frontier from the best combinations of inputs and outputs. However, it is rigid when weighting multiple inputs and outputs that are self-reported. The raw efficiency loosens this restriction. It is developed as an extension of DEA. Its use is suitable for the construction of synthetic indices ([Martí and Puertas, 2020](#); [Wu et al., 2021](#); [Guaita-Martínez et al., 2022](#)). It was originally proposed by [Sexton et al. \(1986\)](#) and validated by [Doyle and Green \(1994\)](#). It offers a ranking of all DMUs in the sample. It avoids the identical values that may occur in situations where several observations attain maximum efficiency. The assessment of a DMU is performed based on the weights of the inputs or outputs of the rest of the DMUs in the sample. The procedure is repeated with all observations until the matrix of raw efficiency is complete. Each element is calculated using the following formula:

$$E_{kj} = \frac{\sum_{r=1}^s u_{rk} y_{rj}}{\sum_{i=1}^m v_{ik} x_{ij}} \quad j = 1, \dots, n; \quad k = 1, \dots, n \quad (1)$$

Here, u_{rk} and v_{ik} are the optimal weights from the DEA for each DMU, x_{ij} is the quantity of input i consumed by the j -th unit, y_{rj} is the observed quantity of output r produced by the j -th unit and E_{kj} is an element of the raw efficiency matrix. E_{kj} is calculated by evaluating DMU_j with the optimal weights of DMU_k. Hence, the average score of DMU_j results from the calculation of the average scores of the corresponding column.

$$E_j = \frac{1}{n} \sum_{k=1}^n E_{kj} \quad j = 1, \dots, n \quad (2)$$

Here, E_j is the average efficiency of observation j . Both methods of efficiency were implemented using the `deaR` library of the free software Rstudio ([Coll-Serrano et al., 2018](#)).

3.2 Data

The proposed methods required the identification of the inputs and outputs to construct the production function. The absence of official statistics on this business ecosystem meant that a survey was used to collect the data to meet the research aims. The fieldwork was performed in the second half of 2022 using a sample of Spanish firms. Data were gathered on a sample of Spanish companies drawn from two cooperative federations (Centro Internacional de Investigación e Información sobre la Economía Pública, Social y Cooperativa (CIRIEC) and Federación Valenciana de Empresas Cooperativas de Trabajo Asociado (FEVECTA)). These federations provided the e-mail addresses of the executives of the start-ups. These firms were all cooperatives. They were contacted randomly by e-mail. The survey was performed online. The managers of the firms received a link to the questionnaire. They provided data on the most relevant features of their firms in relation to incubators and start-ups. The questionnaire had 37 items on attributes and characteristics of entrepreneurs and incubators. To ensure that the data were related to the social sector of the economy, the survey targeted only managers of social start-ups whose legal structure was that of a social cooperative. All firms were jointly owned and were run democratically. Their members had shared economic, social and cultural aspirations. The items of the questionnaire sought to cover all company characteristics in relation to incubators and start-ups. The questionnaire items were designed to provide data that would enable analysis of the impact of social incubators on the efficiency of social start-ups (Kher *et al.*, 2023; Kulikova *et al.*, 2022). Table 2

Phase 1		
Type	Question	Unit
Input	Does the incubator provide physical resources such as shared equipment, facilities and office space?	It does not provide such resources; it provides such resources at a cost; it provides such resources free of charge
Input	Indicate the amount of funding provided by the incubator to your start-up	0€; less than 10,000€; 10,000–25,000€; 25,001–100,000€ more than 100,000€
Input	Can the incubator support only start-ups in your specific sector or start-ups from a wide range of sectors?	It focusses on one sector; it focusses on a wide range of sectors
Input	Does the incubator offer learning programmes such as coaching, training or both?	No; it offers coaching or training; it offers coaching and training
Output	Type of internal and external networks	None; strong external or internal communication networks; strong internal and external communication networks
Output	Indicate the incubator's record in terms of successful start-ups nurtured within the incubator	No such examples or poor record; decent record; good record
Phase 2		
Input	Indicate your financial resources	<1,000€; 1,000–9,999€; 10,000–99,999€; 100,000–249,999€; 250,000–499,999€; >500,000€
Input	Professional experience	None; <5 years, 6–10 years; 11–15 years; 16–20 years; >20 years
Input	Personal educational level	No formal education; primary education; secondary education; non-compulsory secondary education; professional training; undergraduate degree; master's/PhD degree
Input	Number of firms in which you have participated	1; 2–3; 4–5; >5
Input	Level of efficiency of the incubators (Phase 1)	Values greater than or equal to 1
Output	Age of the social start-up	Number of years
Output	Average size of the social start-up	Number of employees

Source(s): Authors' own creation

Table 2.
Inputs and outputs
used in each phase of
research

shows the items used in each of the research phases, as well as their categorisation as inputs or outputs.

All variables were coded in ascending order to enable the subsequent calculations. The choice of inputs and outputs was tailored to the aims of the research phase. For example, the efficiency of social incubators was calculated based on four inputs that covered services or support offered to social start-ups and two outputs that indicated success. In Phase 2, the inputs represented the available resources and human capital (four or five inputs) and the outputs represented the strength of social start-ups housed in the incubator (two outputs). At this stage, the procedure was as follows: the efficiency of social start-ups was calculated without taking into account the work of incubators (four inputs). The efficiency of incubators was then included to analyse their impact (five inputs). The proportion of inputs to outputs to DMUs was determined by Cooper's rule (Cooper *et al.*, 2011).

The application of the cross-efficiency method also required the definition of inputs and outputs. However, in this case, the choice was outside the scope of logical selection (Puertas and Martí, 2023; Martí *et al.*, 2022). Categories were assigned based on principal component analysis, observing the results of the Kaiser-Meyer-Olkin criterion (KMO) test and Bartlett's test and using varimax rotation (Calafat-Marzal *et al.*, 2023). The results are shown in Table 3.

4. Results and discussion

Q1. What is the impact of social incubator efficiency on the development of social start-ups?

Bootstrap DEA was used to construct three production functions and evaluate the effect of social incubators on the efficiency of social start-ups. The procedure was as follows: (1) efficiency of social incubators; (2) efficiency of social start-ups not accounting for the actions of incubators; (3) efficiency of social start-ups, including the efficiency of social incubators as an input. Omitting the third step, the second step determined the impact of the actions of incubators on social start-ups. Table 4 shows the results of the first 10 DMUs. The columns (in order) show the following: observations (DMUs), incubator efficiency

Table 3.
Inputs and outputs
used to construct the
synthetic index
(Phase 3)

Phase 3		
Input	Level of efficiency of incubators	Values greater than or equal to 1
Input	Aim of social start-up: desire to solve a social problem	Completely disagree; disagree; somewhat disagree; neither agree nor disagree; somewhat agree; agree; completely agree
Output	Level of efficiency of social start-ups	Values greater than or equal to 1
Output	Aim of social start-up: desire to expand to global markets	Completely disagree; disagree; somewhat disagree; neither agree nor disagree; somewhat agree; agree; completely agree
Output	Reasons for using Lean Start-up: need to adjust the product to the market rapidly	Completely disagree; disagree; somewhat disagree; neither agree nor disagree; somewhat agree; agree; completely agree
Output	Reasons for using Lean Start-up: need to avoid the waste of scarce resources	Completely disagree; disagree; somewhat disagree; neither agree nor disagree; somewhat agree; agree; completely agree
Output	Satisfaction with the results of adopting the Lean Start-up model in relation to the digitalisation of your start-up	Completely dissatisfied; dissatisfied; somewhat dissatisfied; neither satisfied nor dissatisfied; somewhat satisfied; satisfied; completely satisfied
Source(s): Authors' own creation		

					Start-ups' role in entrepreneur behaviour
DMUs	EFF_incub	EFF_SS	EF_SS + Incub	contrib_incubator	
id_1	1.0041	1.12	1.10	1.1%	2013
id_2	1.0059	1.53	1.11	42.2%	
id_3	1.0036	1.16	1.14	2.0%	
id_4	1.0045	1.25	1.21	4.1%	
id_5	1.0023	1.32	1.07	26.0%	
id_6	1.0550	1.32	1.09	22.9%	
id_7	1.5091	5.27	5.17	10.6%	
id_8	1.0123	1.24	1.20	4.5%	
id_9	1.0265	1.13	1.10	3.3%	
id_10	1.0107	2.83	2.63	20.1%	
Mean	1.0753	2.55	2.20	35.5%	

Source(s): Authors' own creation

Table 4.
Levels of efficiency in
bootstrap DEA

(EFF_incub), social start-up efficiency (EFF_SS), social start-up efficiency with incubator influence (EFF_SS + Incub) and increase in efficiency due to incubators (contrib_incubator).

The results confirm the effective actions of social incubators. The exception is observation 7, whose inefficiency is greater than 50%. In other words, with the available inputs, the networks provided and the success of the start-ups created within the incubator should increase by 50.91%. The remaining DMUs have an inefficiency of 0.2% (id_5) to 5.5% (id_6). These percentages are low given the scope of tasks undertaken by the incubators. In these incubators, social impact, ethical business learning and corporate social responsibility (CSR) form the core of their identity (Sansone *et al.*, 2020; Balon *et al.*, 2022).

These organisations highlight the importance of social capital through collaboration between incubators, social start-ups and stakeholders (Nicolopoulou *et al.*, 2017). However, actions by social incubators may be perceived as quite distinct from profit-seeking. Hence, authors such as Klofsten *et al.* (2020) have described the ideal incubator as a hybrid that supports both social start-ups and traditional start-ups. However, there are discrepancies in this regard. Authors such as Sansone *et al.* (2020) have advocated an exclusive focus on social start-ups given the importance social innovation. This debate reveals the contradictions during the incipient stage of these institutions and their need to consolidate their position. This situation is linked to their rapid international growth in response to the expansion of the social economy as part of the renewal of the welfare system (Giordano *et al.*, 2021).

In the case of social start-ups, inefficiency is considerably higher, in accordance with the risk associated with this business ecosystem (Thomas *et al.*, 2019; Yang *et al.*, 2020). DMUs id_7 and id_2 have notable levels of inefficiency. For DMUs, inefficiency generally ranges from 12% (id_1) to 53% (id_2). These companies should meet the same requirements as innovative start-ups. However, they normally develop in more hostile environments (Palazzo *et al.*, 2021). Hence, the demands to ensure their success tend to be higher. Authors such as Al-Kilani *et al.* (2021) showed that the creation of networks and collaboration are success factors in most social business hubs.

Finally, when calculating the efficiency of social start-ups under the influence of incubators, the results reveal improvements of 1.1% (id_1) to 42.2% (id_2). Regardless of the behaviour of social start-ups, social incubators significantly improve their efficiency, measured in terms of firm survival and size. These results contradict those reported by Nicholls-Nixon and Valliere (2021), who showed the close relationship between the success of incubators and that of social start-ups. The activities offered should be assessed separately. The success of some could be overshadowed by the failure of others. For example, according to Pandey *et al.* (2017), mentoring has a positive relationship when the level of education of the founding team is high and a negative relationship when management experience is high.

Q2. Is the potential of social start-ups conditioned by the founding team profile?

Application of the cross-efficiency method enabled the construction of a synthetic index to rank the social start-ups considered in this study. The results are grouped by sector to identify which is best positioned and to provide insight tailored to the target area (Table 5). Several columns have been added to define the average profile of the entrepreneurs.

Table 5 shows seven sectors. In general, the surveyed social start-ups are characterised by the receipt of subsidies and limited financial involvement. All members have a high level of education and are aged above 40 years old, except in the research sector. Food and information and communication technology (ICT) social start-ups are in the top positions of the ranking. Social start-ups in the social services and research sectors occupy the lowest positions. In particular, in the top two, the founding team has experience in the sector of more than 10 years and professional experience of 20 years or more. Such founding teams do not wish to relinquish control of their social start-ups. Moreover, both must satisfy investor needs, with a percentage of equity of 15% at most in the case of the food sector. There is a family link to entrepreneurship. In contrast, in social services and research, the founding team shows an interest only in the creation phase, relinquishing subsequent control of the venture. Founders in these sectors and the engineering sector lack a family culture of entrepreneurship and do not feel forced to satisfy investors. Gender-based differences are imperceptible in terms of type of funding and receipt of subsidies. These findings contradict those of other studies, which have shown inequalities in this regard (Newbert *et al.*, 2022).

However, it is difficult to extrapolate this social entrepreneurship profile to the entire universe of social start-ups. According to Salamzadeh *et al.* (2017), the founding team of ICT social start-ups is normally characterised by a high level of education and youthfulness, as well as a willingness to use equity in the initial stages of development. Undoubtedly, educational systems should evolve to meet the needs of students and provide them with the skills they need to develop sustainable companies. Fiofanova (2020) highlighted the ability to ensure product or service functionality, as well as the organisational design of social transformations. Helsen *et al.* (2021) showed the need to enhance innovative qualities, cognitive skills and the ability to create inspirational networks to ensure effective business strategies. Artificial intelligence has profound implications for entrepreneurship, positively affecting decision making and business performance (Giuggioli and Pellegrini, 2023).

For start-ups to grow, investors must be prepared to fund ventures that are sometimes nothing more than innovative ideas. These new ventures must be distinctive from their peers to stand out and attract critical resources (Taeuscher *et al.*, 2021). Normally, the funding that is provided depends on the authenticity of the founding team and the importance of the social problem that the firm seeks to address. The financial sustainability of the founding team plays a secondary role (Block *et al.*, 2021; Stefanelli *et al.*, 2022). This notion is consistent with the results, which show that the equity provided by the founding team is at most 15%.

5. Conclusions

Traditionally, the business ecosystem is oriented towards profit-seeking. Questions of sustainability, which is where monetary gain is transformed into social value with universal benefits, have tended to be of secondary concern. Social start-ups are rapidly emerging in a society that must follow the path set by the 2023 Agenda. These social start-ups are backed by social incubators and accelerators, which help with market entry. This study provides evidence of the impact of social incubators on the effective development of social start-ups, as well as the founding team profile.

There is substantial literature on the relevance of social incubators that provide assistance throughout the entrepreneurship process to help social start-ups become a reality and ensure

Rank	Sector	Years worked in sector	Receipt of subsidies	Desire for control	Type of funding	Entrepreneurs in the family	Need to satisfy investors	Gender	Average age in years	Professional experience in years	Personal educational level
1	Food	100% more than 10	100%	100%	Equity of 15% or less	100%	100%	100% women	51	100% more than 20	100% degree
2	ICT	100% more than 10	80%	100%	60% equity	80%	60%	80% men	46.4	50% more than 20	50% master's
3	Various	75% more than 10	50%	100%	25% equity	75%	25%	75% men	49.5	25% more than 20	100% degree
4	Financial services	75% less than 5	100%	75%	Equity of 15% or less	50%	50%	50% men	42	50% more than 20	75% degree
5	Engineering	66% from 6 to 10	100%	100%	Equity of 15% or less	no	no	100% men	53	66% more than 20	66% degree
6	Social services	66% more than 10	100%	no	Equity of 15% or less	no	no	100% women	41	66% less than 15	66% master's
7	Research	100% less than 3	100%	no	Equity not provided	no	no	100% men	26	100% less than 5	100% master's
Source(s): Author's own creation											

Table 5.
Sector ranking of social
start-ups and features
of the founding team

the sustainability of the planet. They provide support in the form of specialist training, mentoring, access to funding, market positioning and contact networks to ensure the success of tenant firms. They have sometimes been defined as laboratories of ideas that offer solutions to major social and environmental challenges (Toivonen, 2016). This study aimed to provide richer knowledge of a business ecosystem that is strongly emerging in all economies. The efficiency impact of social incubators on social start-ups was quantified. The study shows that their positive effects are independent of the efficiency of the start-up itself.

Traditionally, considerable attention has been paid to the measured value of start-ups, as well as their business model. The question of the funding team profile has been of secondary concern. However, the importance of the founding team is such that the creation and development of a venture primarily owes to the capacity of founding team members. The skills of the team are decisive in ensuring the success of all kinds of businesses, particularly social start-ups, whose mission goes beyond purely economic performance. The present study provides a synthetic index of the sectors of the analysed social start-ups. The results show that, regardless of the sector, the founding teams have high educational levels and require both subsidies and external investment to develop their ideas.

In short, the research provides evidence of the need for social start-ups to have support at all growth stages to succeed. Decision makers should promote the creation of incubators to guide these new companies and ensure that they meet their objectives. The role of higher education institutions should be encouraged as a niche for new social business ideas, accompanying, advising and guiding novel entrepreneurs.

All empirical analyses suffer from limitations, despite researchers' attempts to minimise them. For example, this study used static analysis based on efficiency models. It offers results based on information provided at a specific time. It would be of interest to carry out further surveys at different growth stages of social start-ups to analyse their evolution and changing needs. Future studies are also planned to compare social and traditional start-ups' behaviour to evaluate possible differences.

References

- Aernoudt, R. (2004), "Incubators: tool for entrepreneurship?", *Small Business Economics*, Vol. 23, pp. 127-135, doi: [10.1023/B:SBEJ.0000027665.54173.23](https://doi.org/10.1023/B:SBEJ.0000027665.54173.23).
- Ahmed, D., Salloum, S.A. and Shaalan, K. (2021), "Knowledge management in start-ups and SMEs: a systematic review", in Al-Emran, M. and Shaalan, K. (Eds), *Recent Advances in Technology Acceptance Models and Theories. Studies in Systems, Decision and Control*, Springer, Cham, Vol. 335, doi: [10.1007/978-3-030-64987-6_22](https://doi.org/10.1007/978-3-030-64987-6_22).
- Al-Kilani, M., Verkuil, A.H. and Meyer, R. (2021), "Evaluating the key success factors of social business hubs in the Middle East", *International Journal of Science and Business*, Vol. 5 No. 8, pp. 289-304, doi: [10.5281/zenodo.5140107](https://doi.org/10.5281/zenodo.5140107).
- Al-Qudah, A.A., Al-Okaily, M. and Alqudah, H. (2022), "The relationship between social entrepreneurship and sustainable development from economic growth perspective: 15 'RCEP' countries", *Journal of Sustainable Finance and Investment*, Vol. 12 No. 1, pp. 44-61, doi: [10.1080/20430795.2021.1880219](https://doi.org/10.1080/20430795.2021.1880219).
- Angrisani, M., Cannavacciuolo, L. and Rippa, P. (2023), "Framing the main patterns of an academic innovation ecosystem. evidence from a knowledge-intensive case study", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 11, pp. 109-131, doi: [10.1108/IJEER-12-2022-1088](https://doi.org/10.1108/IJEER-12-2022-1088).
- Ander, R. and Kapoor, R. (2010), "Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations", *Strategic Management Journal*, Vol. 31 No. 3, pp. 306-333, doi: [10.1002/smj.821](https://doi.org/10.1002/smj.821).

-
- Balon, V., Kottala, S.Y. and Reddy, K.S. (2022), "Mandatory corporate social responsibility and firm performance in emerging economies: an institution-based view", *Sustainable Technology and Entrepreneurship*, Vol. 1 No. 3, 100023, doi: [10.1016/j.stae.2022.100023](https://doi.org/10.1016/j.stae.2022.100023).
- Banker, R.D., Charnes, A. and Cooper, W.W. (1984), "Some models for estimating technical and scale inefficiencies in data envelopment analysis", *Management Science*, Vol. 30 No. 9, pp. 1078-1092, doi: [10.1287/mnsc.30.9.1078](https://doi.org/10.1287/mnsc.30.9.1078).
- Baskaran, A., Chandran, V.G.R. and Ng, B.K. (2019), "Inclusive entrepreneurship, innovation and sustainable growth: role of business incubators, academia and social enterprises in Asia", *Science, Technology and Society*, Vol. 24 No. 3, pp. 385-400, doi: [10.1177/0971721819873178](https://doi.org/10.1177/0971721819873178).
- Blank, T.H. (2021), "When incubator resources are crucial: survival chances of student startups operating in an academic incubator", *Journal of Technology Transfer*, Vol. 46, pp. 1845-1868, doi: [10.1007/s10961-020-09831-4](https://doi.org/10.1007/s10961-020-09831-4).
- Block, J.H., Hirschmann, M. and Fisch, C. (2021), "Which criteria matter when impact investors screen social enterprises?", *Journal of Corporate Finance*, Vol. 66, 101813, doi: [10.1016/j.jcorpfin.2020.101813](https://doi.org/10.1016/j.jcorpfin.2020.101813).
- Bozhikin, I., Macke, J. and Folchini da Costa, L. (2019), "The role of government and key non-state actors in social entrepreneurship: a systematic literature review", *Journal of Cleaner Production*, Vol. 226, pp. 730-747, doi: [10.1016/j.jclepro.2019.04.076](https://doi.org/10.1016/j.jclepro.2019.04.076).
- Bucci, A. and Marks, J. (2022), "Social entrepreneurs' learning experience in South African incubators", *Africa Journal of Management*, Vol. 8 No. 3, pp. 374-398, doi: [10.1080/23322373.2022.2071573](https://doi.org/10.1080/23322373.2022.2071573).
- Calafat-Marzal, C., Sánchez-García, M., Marti, L. and Puertas, R. (2023), "Agri-food 4.0: Drivers and links to innovation and eco-innovation", *Computers and Electronics in Agriculture*, Vol. 207, 107700, doi: [10.1016/j.compag.2023.107700](https://doi.org/10.1016/j.compag.2023.107700).
- Capatina, A., Cristea, D.S., Micu, A., Micu, A.E., Empoli, G. and Codignola, F. (2023), "Exploring causal recipes of startup acceptance into business incubators: a cross-country study", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 7, pp. 1584-1612, doi: [10.1108/IJEBR-06-2022-0527](https://doi.org/10.1108/IJEBR-06-2022-0527).
- Casasnovas, G. and Bruno, A.V. (2013), "Scaling social ventures: an exploratory study of social incubators and accelerators", *Journal of Management for Global Sustainability*, Vol. 2, pp. 173-197, doi: [10.13185/JM2013.01211](https://doi.org/10.13185/JM2013.01211).
- CBINSIGHTS (2021), "The top 12 reasons startups fail", available at: <https://www.cbinsights.com/research/startup-failure-reasons-top/>
- Charnes, A., Cooper, W. and Rhodes, E. (1978), "Measuring the efficiency of decision making units", *European Journal of Operational Research*, Vol. 2 No. 6, pp. 429-444, doi: [10.1016/0377-2217\(78\)90138-8](https://doi.org/10.1016/0377-2217(78)90138-8).
- Coll-Serrano, V., Benitez, R. and Bolós, V.J. (2018), *Tutorial Data Envelopment Analysis with deaR*, Version 1.4, Universitat de València.Facultat d'Economia.
- Cooper, W.W., Seiford, L.M. and Zhu, J. (2011), *Handbook on Data Envelopment Analysis*, Springer.
- Crișan, E.L., Salanță, I.L., Beleiu, I.N., Bordean, O.N. and Bunduchi, R. (2021), "A systematic literature review on accelerators", *Journal of Technology Transfer*, Vol. 46, pp. 62-89, doi: [10.1007/s10961-019-09754-9](https://doi.org/10.1007/s10961-019-09754-9).
- Dixit, J.K., Agarwal, S., Ramadani, V. and Agrawal, V. (2023), "Assessing the factors of sustainable entrepreneurial attitude in context of educational institutions: AHP and DEMATEL approach", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 2, pp. 506-529, doi: [10.1108/IJEBR-05-2022-0446](https://doi.org/10.1108/IJEBR-05-2022-0446).
- Doyle, J. and Green, R. (1994), "Efficiency and cross-efficiency in DEA: Derivations, meanings and uses", *Journal of the Operational Research Society*, Vol. 45, pp. 567-578, doi: [10.1057/jors.1994.84](https://doi.org/10.1057/jors.1994.84).

- Durand, D. and Mulcair, C. (2023), "What's the big idea? The crossroads between investment and IP", in Bader, M.A. and Süzeroglu-Melchior, S. (Eds), *Intellectual Property Management for Start-Ups. Management for Professionals*, Springer, Cham, doi: [10.1007/978-3-031-16993-9_8](https://doi.org/10.1007/978-3-031-16993-9_8).
- Eisenmann, T. (2021), *Why Startups Fail: A New Roadmap for Entrepreneurial Success*, Currency, New York.
- Fernandes, C.C., Mazzola, B.G., Esteves, K. and de Miranda Oliveira, M. (2019), "Practices and indicators of sustainability in business incubators", in Oliveira, M., Jr., Cahen, F. and Borini, F. (Eds), *Start-ups and Innovation Ecosystems in Emerging Markets*, Palgrave Macmillan, Cham, doi: [10.1007/978-3-030-10865-6_8](https://doi.org/10.1007/978-3-030-10865-6_8).
- Figueredo-Rocha, C., Falcão Mamédio, D. and Olavo Quandt, C. (2019), "Start-ups and the innovation ecosystem in Industry 4.0", *Technology Analysis and Strategic Management*, Vol. 31 No. 12, pp. 1474-1487, doi: [10.1080/09537325.2019.1628938](https://doi.org/10.1080/09537325.2019.1628938).
- Fiofanova, O.A. (2020), "Startup management in social entrepreneurship: a strategy for building technological potential and overcoming of the trap of the average income", in Bogoviz, A. (Ed.), *Complex Systems: Innovation and Sustainability in the Digital Age. Studies in Systems, Decision and Control*, Springer, Cham, Vol. 282, doi: [10.1007/978-3-030-44703-8_1](https://doi.org/10.1007/978-3-030-44703-8_1).
- García-Mollá, M., Puertas, R. and Sanchis-Ibor, C. (2022), "Application of data envelopment analysis to evaluate investments in the modernization of collective management irrigation systems in Valencia (Spain)", *Water Resources Management*, Vol. 35, pp. 5011-5027, doi: [10.1007/s11269-021-02986-1](https://doi.org/10.1007/s11269-021-02986-1).
- Giuggioli, G. and Pellegrini, M.M. (2023), "Artificial intelligence as an enabler for entrepreneurs: a systematic literature review and an agenda for future research", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 4, pp. 816-837, doi: [10.1108/IJEER-05-2021-0426](https://doi.org/10.1108/IJEER-05-2021-0426).
- Giordano, F., Lanteri, A. and Michelini, L. (2021), "Are social incubators social enterprises? A study of Italian social incubators", in Ince-Yenilmez, M. and Darici, B. (Eds), *Engines of Economic Prosperity*, Palgrave Macmillan, Cham, doi: [10.1007/978-3-030-76088-5_7](https://doi.org/10.1007/978-3-030-76088-5_7).
- González-Cruz, T.F., Botella-Carrubi, D. and Martínez-Fuentes, C.M. (2020), "The effect of firm complexity and founding team size on agile internal communication in startups", *International Entrepreneurship and Management Journal*, Vol. 16, pp. 1101-1121, doi: [10.1007/s11365-019-00633-1](https://doi.org/10.1007/s11365-019-00633-1).
- Granstrand, O. and Holgersson, M. (2020), "Innovation ecosystems: a conceptual review and a new definition", *Technovation*, Vols 90-91, 102098, doi: [10.1016/j.technovation.2019.102098](https://doi.org/10.1016/j.technovation.2019.102098).
- Guaita-Martínez, J.M., Puertas, R., Martín-Martín, J.M. and Domingo Ribeiro-Soriano, D. (2022), "Digitalization, innovation and environmental policies aimed at achieving sustainable production", *Sustainable Production and Consumption*, Vol. 32, pp. 92-100, doi: [10.1016/j.spc.2022.03.035](https://doi.org/10.1016/j.spc.2022.03.035).
- Hausberg, J.P. and Korreck, S. (2020), "Business incubators and accelerators: a co-citation analysis-based, systematic literature review", *Journal of Technology Transfer*, Vol. 45 No. 1, pp. 151-176, doi: [10.1007/s10961-018-9651-y](https://doi.org/10.1007/s10961-018-9651-y).
- Hensel, R., Visser, R., Overdiek, A. and Sjoer, E. (2021), "A small independent retailer's performance: influenced by innovative strategic decision-making skills?", *Journal of Innovation and Knowledge*, Vol. 6 No. 4, pp. 280-289, doi: [10.1016/j.jik.2021.10.002](https://doi.org/10.1016/j.jik.2021.10.002).
- Herrera, S. and Pang, G. (2005), "Efficiency of public spending in developing countries: an efficiency Frontier approach 1, 2 & 3", Policy Research Working Papers, doi: [10.1596/1813-9450-3645](https://doi.org/10.1596/1813-9450-3645).
- Hirschmann, M. and Block, J.H. (2022), "Trademarks and how they relate to the sustainability and economic outcomes of social start-ups", *Journal of Cleaner Production*, Vol. 376, 134320, doi: [10.1016/j.jclepro.2022.134320](https://doi.org/10.1016/j.jclepro.2022.134320).
- Hirschmann, M., Moritz, A. and Block, J.H. (2022), "Motives, supporting activities, and selection criteria of social impact incubators: an experimental conjoint study", *Nonprofit and Voluntary Sector Quarterly*, Vol. 51 No. 5, pp. 1074-1094, doi: [10.1177/08997640211057402](https://doi.org/10.1177/08997640211057402).

-
- Ho, J.Y. and Yoon, S. (2022), "Ambiguous roles of intermediaries in social entrepreneurship: the case of social innovation system in South Korea", *Technological Forecasting and Social Change*, Vol. 175, 121324, doi: [10.1016/j.techfore.2021.121324](https://doi.org/10.1016/j.techfore.2021.121324).
- Hussain, B., Sheikh, A.Z. and Fatima, T. (2022), "Learning social entrepreneurship: experiences of sociology students", *Cogent Business and Management*, Vol. 9 No. 1, doi: [10.1080/23311975.2022.2032539](https://doi.org/10.1080/23311975.2022.2032539).
- Joseph, G., Aboobaker, N. and Zakkariya, K.A. (2023), "Entrepreneurial cognition and premature scaling of start-ups: a qualitative analysis of determinants of start-up failures", *Journal of Entrepreneurship in Emerging Economies*, Vol. 15 No. 1, pp. 96-112, doi: [10.1108/JEEE-11-2020-0412](https://doi.org/10.1108/JEEE-11-2020-0412).
- Karahan, M., Rashid, L. and Kratzer, J. (2022), "Gearing-up for purpose: the relationship between entrepreneurs' usage of incubation support services and sustainable impacts", *Journal of Cleaner Production*, Vol. 377, 134315, doi: [10.1016/j.jclepro.2022.134315](https://doi.org/10.1016/j.jclepro.2022.134315).
- Khan, R.U., Richardson, C. and Salamzadeh, Y. (2022), "Spurring competitiveness, social and economic performance of family-owned SMEs through social entrepreneurship: a multi-analytical SEM & ANN perspective", *Technological Forecasting and Social Change*, Vol. 184, 122047, doi: [10.1016/j.techfore.2022.122047](https://doi.org/10.1016/j.techfore.2022.122047).
- Kher, R., Yang, S. and Newbert, S.L. (2023), "Accelerating emergence: the causal (but contextual) effect of social impact accelerators on nascent for-profit social ventures", *Small Business Economics*, Vol. 61, pp. 389-413, doi: [10.1007/s11187-022-00680-z](https://doi.org/10.1007/s11187-022-00680-z).
- Klofsten, M., Lundmark, E., Wennberg, K. and Bank, N. (2020), "Incubator specialization and size: Divergent paths towards operational scale", *Technological Forecasting and Social Change*, Vol. 151, 119821, doi: [10.1016/j.techfore.2019.119821](https://doi.org/10.1016/j.techfore.2019.119821).
- Kraus, S., Bouncken, R.B., Görmär, L., González-Serrano, M.H. and Calabuig, F. (2022), "Coworking spaces and makerspaces: mapping the state of research", *Journal of Innovation and Knowledge*, Vol. 7, 100161, doi: [10.1016/j.jik.2022.100161](https://doi.org/10.1016/j.jik.2022.100161).
- Kuckertz, A., Bernhard, A., Berger, E.S.C., Dvoutely, O., Harms, R., Jack, S. and Kibler, E. (2023), "Scaling the right answers – creating and maintaining hope through social entrepreneurship in light of humanitarian crises", *Journal of Business Venturing Insights*, Vol. 19, e00356, doi: [10.1016/j.jbvi.2022.e00356](https://doi.org/10.1016/j.jbvi.2022.e00356).
- Kulikova, M.A., Molchan, A.S., Polujanova, N.V., Balamirzoev, N.L. and Galieva, G.F. (2022), "Smart social infrastructure as the basis for the long-term development of social entrepreneurship: problems and prospects in Russia", in Popkova, E.G. (Ed.), *Business 4.0 as a Subject of the Digital Economy. Advances in Science, Technology & Innovation*, Springer, Cham, doi: [10.1007/978-3-030-90324-4_2](https://doi.org/10.1007/978-3-030-90324-4_2).
- Lamperti, S., Sammut, S. and Courrent, J.-M. (2023), "From incubator's knowledge transfer to sustainability start-ups' impact: a case study in a French support program", *Journal of Knowledge Management*, Vol. ahead-of-print No. ahead-of-print, doi: [10.1108/JKM-09-2022-0690](https://doi.org/10.1108/JKM-09-2022-0690).
- Luc, P.T., Lan, P.X., Le, A.N.H. and Bui Thanh Trang, B.T. (2022), "A co-citation and co-word analysis of social entrepreneurship research", *Journal of Social Entrepreneurship*, Vol. 13 No. 3, pp. 324-339, doi: [10.1080/19420676.2020.1782971](https://doi.org/10.1080/19420676.2020.1782971).
- Marcon, A. and Duarte Ribeiro, J.L. (2021), "How do start-ups manage external resources in innovation ecosystems? A resource perspective of start-ups' lifecycle", *Technological Forecasting and Social Change*, Vol. 171, 120965, doi: [10.1016/j.techfore.2021.120965](https://doi.org/10.1016/j.techfore.2021.120965).
- Martí, L., Cervelló-Royo, R. and Puertas, R. (2022), "Analysis of the nexus between country risk, environmental policies, and human development", *Energy Research and Social Science*, Vol. 92, 102767, doi: [10.1016/j.erss.2022.102767](https://doi.org/10.1016/j.erss.2022.102767).
- Martí, L. and Puertas, R. (2020), "Assessment of sustainability using a synthetic index", *Environmental Impact Assessment Review*, Vol. 84, 106375, doi: [10.1016/j.eiar.2020.106375](https://doi.org/10.1016/j.eiar.2020.106375).

- Maughan, R. (2023), "Adopting and adapting sustainability accounting: fit and faith in a family business", *Accounting, Auditing and Accountability Journal*, Vol. 36 No. 9, pp. 1-31, doi: [10.1108/AAAJ-02-2020-4410](https://doi.org/10.1108/AAAJ-02-2020-4410).
- Miller, V. and Pätzmann, J.U. (2023), "What is known about startup founding teams", in Miller, V. and Pätzmann, J.U. (Eds), *Archetypical Roles in Startups. Business Guides on the Go*, Springer, Cham, pp. 19-42, doi: [10.1007/978-3-031-22253-5_2](https://doi.org/10.1007/978-3-031-22253-5_2).
- Miranda, M.G. and Borges, R. (2019), "Technology-based business incubators: an exploratory analysis of intra-organizational social networks", *Innovation and Management Review*, Vol. 16 No. 1, pp. 36-54, doi: [10.1108/INMR-04-2018-0017](https://doi.org/10.1108/INMR-04-2018-0017).
- Mohammadi, N. and Sakhteh, S. (2023), "Start-up accelerator value chain: a systematic literature review", *Management Review Quarterly*, Vol. 73, pp. 661-694, doi: [10.1007/s11301-021-00257-2](https://doi.org/10.1007/s11301-021-00257-2).
- Moskovicz, A. (2021), "Intrapreneurship, start-ups & innovation: a comprehensive user manual", *International Journal of Economics, Commerce and Management*, Vol. IX, pp. 241-252.
- Mwenda, E., Muange, E.N., Ngigi, M.W. and Kosgei, A. (2023), "Impact of ICT-based pest information services on tomato pest management practices in the Central Highlands of Kenya", *Sustainable Technology and Entrepreneurship*, Vol. 2 No. 2, 100036, doi: [10.1016/j.stae.2022.100036](https://doi.org/10.1016/j.stae.2022.100036).
- Newbert, S.L., Kher, R. and Yang, S. (2022), "Now that's interesting and important! Moving beyond averages to increase the inferential value of empirical findings in entrepreneurship research", *Journal of Business Venturing*, Vol. 37 No. 2, 106185, doi: [10.1016/j.jbusvent.2021.106185](https://doi.org/10.1016/j.jbusvent.2021.106185).
- Nicholls-Nixon, C.L. and Valliere, D. (2021), "Entrepreneurial logic and fit: a cross-level model of incubator performance", *International Journal of Entrepreneurial Behavior and Research*, Vol. 27 No. 7, pp. 1696-1723, doi: [10.1108/IJEBR-11-2020-0801](https://doi.org/10.1108/IJEBR-11-2020-0801).
- Nicolopoulou, K., Karataç-Özkan, M., Vas, C. and Nouman, M. (2017), "An incubation perspective on social innovation: the London Hub-a social incubator", *R&D Management*, Vol. 47 No. 3, pp. 368-384, doi: [10.1111/radm.12179](https://doi.org/10.1111/radm.12179).
- Nikou, S., Brush, C. and Wraae, B. (2023), "Entrepreneurship educators: a configurational analysis of factors influencing pedagogical choices", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 11, pp. 81-108, doi: [10.1108/IJEBR-08-2022-0760](https://doi.org/10.1108/IJEBR-08-2022-0760).
- Odriozola-Fernández, I. and Berbegal-Mirabent, J. (2020), "The effect of open innovation strategies on business models. A multiple case study in the automotive sector", *International Journal of Intellectual Property Management*, Vol. 10 No. 2, pp. 180-198, doi: [10.1504/IJIPM.2020.108084](https://doi.org/10.1504/IJIPM.2020.108084).
- OECD (2019), "Policy brief on incubators and accelerators that support inclusive entrepreneurship", *OECD SME and Entrepreneurship Papers*, doi: [10.1787/d7d81c23-en](https://doi.org/10.1787/d7d81c23-en).
- Palazzo, L., Sabatino, P. and Levoli, R. (2021), "Determinants of social start-ups in Italy", in Bertaccini, B., Fabbris, L. and Petrucci, A. (Eds), *Statistics and Information Systems for Policy Evaluation. Book of short papers of the opening conference*. Universal, Firenze University Press, doi: [10.36253/978-88-5518-304-8.18](https://doi.org/10.36253/978-88-5518-304-8.18).
- Pandey, S., Lall, S., Pandey, S.K. and Ahlawat, S. (2017), "The appeal of social accelerators: what do social entrepreneurs value?", *Journal of Social Entrepreneurship*, Vol. 8 No. 1, pp. 88-109, doi: [10.1080/19420676.2017.1299035](https://doi.org/10.1080/19420676.2017.1299035).
- Pérez-Zabaleta, A., Pascual-Fernández, P., Prados-Castillo, J.F. and de Castro-Pardo, M. (2022), "Constructing fuzzy composite indicators to support water policy entrepreneurship", *Sustainable Technology and Entrepreneurship*, Vol. 1 No. 3, 100022, doi: [10.1016/j.stae.2022.100022](https://doi.org/10.1016/j.stae.2022.100022).
- Puertas, R. and Marti, L. (2023), "Regional analysis of the sustainable development of two Mediterranean countries: Spain and Italy", *Sustainable Development*, Vol. 31 No. 2, pp. 797-811, doi: [10.1002/sd.2420](https://doi.org/10.1002/sd.2420).
- Puertas, R., Martín-Martín, J.M., Guaita-Martínez, J.M. and Serdeira-Azevedo, P. (2022), "Analysis of the role of innovation and efficiency in coastal destinations affected by tourism seasonality", *Journal of Innovation and Knowledge*, Vol. 7 No. 1, 100163, doi: [10.1016/j.jik.2022.100163](https://doi.org/10.1016/j.jik.2022.100163).

-
- Redondo, M. and Camarero, C. (2019), "Social capital in university business incubators: dimensions, antecedents and outcomes", *International Entrepreneurship and Management Journal*, Vol. 15, pp. 599-624, doi: [10.1007/s11365-018-0494-7](https://doi.org/10.1007/s11365-018-0494-7).
- Ripollés, M. and Blesa, A. (2023), "Moderators of the effect of entrepreneurship education on entrepreneurial action", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 7, pp. 1402-1426, doi: [10.1108/IJEBR-06-2022-0518](https://doi.org/10.1108/IJEBR-06-2022-0518).
- Rosli, A. and Cacciolatti, L. (2022), "The role of universities in the development of the local knowledge base: supporting innovation ecosystems through skills development and entrepreneurship", *International Journal of Intellectual Property Management*, Vol. 12 No. 1, pp. 64-87, doi: [10.1504/IJIPM.2022.121018](https://doi.org/10.1504/IJIPM.2022.121018).
- Saebi, T., Foss, N.J. and Linder, S. (2018), "Social entrepreneurship research: past achievements and future promises", *Journal of Management*, Vol. 45 No. 1, pp. 70-95, doi: [10.1177/0149206318793196](https://doi.org/10.1177/0149206318793196).
- Salamzadeh, A., Arasti, Z. and Elyasi, G.M. (2017), "Creation of ICT-based social start-ups in Iran: a multiple case study", *Journal of Enterprising Culture*, Vol. 25 No. 1, pp. 97-122, doi: [10.1142/S0218495817500042](https://doi.org/10.1142/S0218495817500042).
- Salamzadeh, A., Arasti, Z. and Elyasi, G.M. (2018), "Drawing a supportive framework for creation of social start-ups in accelerators", *Social Capital Management*, Vol. 5 No. 3, pp. 365-384, doi: [10.22059/jscm.2018.252206.1550](https://doi.org/10.22059/jscm.2018.252206.1550).
- Sánchez-Robles, M., Rosa Puertas, R. and Ribeiro-Soriano, D. (2023), "Startup initiatives in social service industries: cohousing and energy communities", *The Service Industries Journal*, doi: [10.1080/02642069.2023.2209018](https://doi.org/10.1080/02642069.2023.2209018).
- Sansone, G., Andreotti, P., Colombelli, A. and Landoni, P. (2020), "Are social incubators different from other incubators? Evidence from Italy", *Technological Forecasting and Social Change*, Vol. 158, 120132, doi: [10.1016/j.techfore.2020.120132](https://doi.org/10.1016/j.techfore.2020.120132).
- Sexton, T.R., Silkman, R.H. and Hogan, A.J. (1986), "Data envelopment analysis: critique and extensions", *New Directions for Program Evaluation*, Vol. 32, pp. 73-105, doi: [10.1002/ev.1441](https://doi.org/10.1002/ev.1441).
- Silva, H.P., Lehoux, P. and Sabio, R.P. (2022), "Is there a fit between incubators and ventures producing responsible innovations in health?", *Health Policy and Technology*, Vol. 11, 100624, doi: [10.1016/j.hlpt.2022.100624](https://doi.org/10.1016/j.hlpt.2022.100624).
- Simar, L. and Wilson, P.W. (2000), "Statistical inference in nonparametric Frontier models: the state of the art", *Journal of Productivity Analysis*, Vol. 13, pp. 49-78, doi: [10.1023/A:1007864806704](https://doi.org/10.1023/A:1007864806704).
- Simar, L. and Wilson, P.W. (2008), "Statistical inference on nonparametric Frontier models: recent developments and perspectives", in Fried, H.O., Knox Lovell, C.A. and Schmidt, S.S. (Eds), *The Measurement of Productive Efficiency and Productivity Growth*, Oxford University Press.
- Solomon, G.T., Alabduljader, N. and Ramani, R.S. (2019), "Knowledge management and social entrepreneurship education: lessons learned from an exploratory two-country study", *Journal of Knowledge Management*, Vol. 23 No. 10, pp. 1984-2006, doi: [10.1108/JKM-12-2018-0738](https://doi.org/10.1108/JKM-12-2018-0738).
- Sonne, L. (2012), "Innovative initiatives supporting inclusive innovation in India: social business incubation and micro venture capital", *Technological Forecasting and Social Change*, Vol. 79 No. 4, pp. 638-647, doi: [10.1016/j.techfore.2011.06.008](https://doi.org/10.1016/j.techfore.2011.06.008).
- Stefanelli, V., Ferilli, G.B. and Boscia, V. (2022), "Exploring the lending business crowdfunding to support SMEs' financing decisions", *Journal of Innovation and Knowledge*, Vol. 7 No. 4, 100278, doi: [10.1016/j.jik.2022.100278](https://doi.org/10.1016/j.jik.2022.100278).
- Tauscher, K., Bouncken, R. and Pesch, R. (2021), "Gaining legitimacy by being different: optimal distinctiveness in crowdfunding platforms", *Academy of Management Journal*, Vol. 64 No. 1, pp. 149-179, doi: [10.5465/amj.2018.0620](https://doi.org/10.5465/amj.2018.0620).
- Thomas, A., Passaro, R. and Quinto, I. (2019), "Developing entrepreneurship in digital economy: the ecosystem strategy for start-ups growth", in Orlando, B. (Ed.), *Strategy and Behaviors in the Digital Economy*, IntechOpen.

- Toivonen, T. (2016), "What is the social innovation community? Conceptualizing an emergent collaborative organization", *Journal of Social Entrepreneurship*, Vol. 7 No. 1, pp. 49-73, doi: [10.1080/19420676.2014.997779](https://doi.org/10.1080/19420676.2014.997779).
- Tripathi, N. and Oivo, M. (2020), "The roles of incubators, accelerators, co-working spaces, mentors, and events in the startup development process", in Nguyen-Duc, A., Münch, J., Prikladnicki, R., Wang, X. and Abrahamsson, P. (Eds), *Fundamentals of Software Start-Ups*, Springer, Cham, doi: [10.1007/978-3-030-35983-6_9](https://doi.org/10.1007/978-3-030-35983-6_9).
- Tsurayya, S., Malika, A., Azzahra, A.L., Fadlurrahman, H. and Dewi, F. (2023), "Determining success criteria for agricultural social start-ups in Indonesia", *Proceedings of the Business Innovation and Engineering Conference*, Atlantis Press, pp. 167-184, doi: [10.2991/978-94-6463-144-9_17](https://doi.org/10.2991/978-94-6463-144-9_17).
- Tziogkidis, P. (2012), "Bootstrap DEA and hypothesis testing", Cardiff Economics Working Papers, No. E2012/18, Cardiff University, Cardiff Business School, Cardiff.
- Valero, J.N., Saitgalina, M. and Black, R.A. (2021), "Understanding the nature of non-profit incubators with other sector incubators in the founding of social change organisations by social entrepreneurs", *Journal of Social Entrepreneurship*, pp. 1-20, doi: [10.1080/19420676.2021.1977975](https://doi.org/10.1080/19420676.2021.1977975).
- Vasconcelos-Gomes, L.A., Figueiredo-Facin, A.L., Sergio-Salerno, M. and Kazuo-Ikenami, R. (2018), "Unpacking the innovation ecosystem construct: evolution, gaps and trends", *Technological Forecasting and Social Change*, Vol. 136, pp. 30-48, doi: [10.1016/j.techfore.2016.11.009](https://doi.org/10.1016/j.techfore.2016.11.009).
- Walske, J., Scarlata, M. and Zacharakis, A. (2018), "Comparing founders' specific human capital in traditional versus philanthropic venture capital firms", in Boubaker, S., Cumming, D. and Nguyen, D.K. (Eds), *Research Handbook of Finance and Sustainability*, Edward Elgar Publishing, pp. 287-303.
- Wu, D., Wang, Y., Liu, Y. and Wu, J. (2021), "DEA cross-efficiency ranking method considering satisfaction and consensus degree", *International Transactions in Operational Research*, Vol. 28 No. 6, pp. 3470-3492, doi: [10.1111/itor.12990](https://doi.org/10.1111/itor.12990).
- Yang, S., Kher, R. and Newbert, S.L. (2020), "What signals matter for social start-ups? It depends: the influence of gender role congruity on social impact accelerator selection decisions", *Journal of Business Venturing*, Vol. 35 No. 2, 105932, doi: [10.1016/j.jbusvent.2019.03.001](https://doi.org/10.1016/j.jbusvent.2019.03.001).
- Yoruk, E., Johnston, A., Maas, G. and Jones, P. (2022), "Conceptualising the transformational power of entrepreneurship from an entrepreneurial ecosystems perspective focusing on environmentally and socially inclusive economic growth", *International Journal of Technological Learning, Innovation and Development*, Vol. 14 Nos 1-2, pp. 192-220, doi: [10.1504/IJTLD.2022.121476](https://doi.org/10.1504/IJTLD.2022.121476).
- Zuazua Ruiz, A., Martín Martín, J.M. and Prados-Castillo, J.F. (2023), "The European Union facing climate change: a window of opportunity for technological development and entrepreneurship", *Sustainable Technology and Entrepreneurship*, Vol. 2 No. 2, 100035, doi: [10.1016/j.stae.2022.100035](https://doi.org/10.1016/j.stae.2022.100035).

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