Preprints.org

Article

Typology of business incubators in Spain according to the stages of startups incubation

Ana Asensio-Ciria , Carmen De-Pablos-Heredero , Francisco José Blanco Jiménez , Antón Garcia Martínez [*]

Article

Typology of Business Incubators in Spain according to the Stages of Startups Incubation

Ana Asensio-Ciria [1], Carmen De- Pablos-Heredero [2], Francisco José Blanco Jiménez [1] and Antón García Martínez [3],*

[1] Department of Applied Economics I and History and Economic Institutions Rey Juan Carlos University, Paseo de los Artilleros s/n, 28032 Madrid, Spain; ana.asensio@urjc.es (A.A.); francisco.blanco@urjc.es (F.J.B)

[2] Department of Business Administration (Administration, Management and Organization), Applied Economics II and Fundamentals of Economic Analysis, Rey Juan Carlos University, Paseo de los Artilleros s/n, 28032 Madrid, Spain; carmen.depablos@urjc.es

[3] Animal Science Department, University of Cordoba, Rabanales University Campus, 14071 Cordoba, Spain; pa1gamaa@uco.es

* Correspondence: pa1gamaa@uco.es

Abstract: The aim of this work was to classify the business incubators in Spain according to the four phases of the startup's incubation process. Considering that the graduation rate implies greater survival and business success of the incubated companies, they have been identified at each stage of the incubation (spread of entrepreneurship, pre-incubation, advanced incubation, and graduation). The activities that present higher impacts on the success of the incubated companies and the activities carried out by the business incubator that have a greater relevance on the graduation of the companies have concretely been considered. Principal component (PC) cluster analysis has been applied. All the incubation variables were used simultaneously, reducing their number, and grouping them into factors. Finally, the cases were grouped according to these latent variables. Principal components analysis reduced dimensionality to 8 factors with a 74 % of explained variance. Factor 1 was positively related to pre-incubation variables, factor 2 was linked to training and collaboration variables within the entrepreneurship diffusion phase. Factor 3, named activity monitoring and control, was related to phase 3 or basic incubation variables. Cluster analysis facilitates the grouping of business incubators into three clusters: Group 1 (16 % of the total), incubators with strong deficits in incubation phases 1, 2 and 3. They are small sized business incubators, often located in rural areas or cities and low graduation rate. Group 2 (30 %), business incubators with very high graduation rate, and strongly positive values in factors 1 and 2. Factor 3, although positive, it is susceptible to improvement. They are the largest group of business incubators and usually located in industrial and technological parks. Group 3 (54 %) is the majority, with values close to cluster 2 and 3.

Keywords: startups; business incubators; entrepreneurship; advice; pre-incubation; incubation; graduation; viability; sustainability

1. Introduction

Startups are engines of social and economic development (Ressin 2022) ; that influence the reduction of unemployment (The World Bank 1999; (Ferreiro Seoane, Mendoza Moheno, and Hernández Calzada 2018) and poverty (Camayo et al. 2017), and favour investment, the growth of the local economy and the improvement of the quality of life (Ballering and Masurel 2020; Xu et al. 2021). Currently, small and medium-sized enterprises (SME) represent 90% of the business fabric in developed countries, a figure that increases to 95% in developing countries. In addition, startups are strategic in innovation, technological advancement, and the viability of ventures (Shehada et al. 2020; United Nations 2024).

Entrepreneurship support during the incubation stage constitutes a priority activity in business incubators and means a strategic factor in the success of the venture and its sustainability (Martínez-Martínez 2022). This phase favours the creation of value, technology transfer, the promotion of

innovation, cluster development and the coordination of participation of universities, research institutes and the business community (De la Hoz-Villar and Prieto-Flórez 2020).

There are multiple nomenclatures to refer to business incubators (BI); such as germinators, business hotels, business incubators, business boutiques, entrepreneur centers, innovative business centers, entrepreneurship centers, business innovation centers, new business centers, business promotion centers, business development support centers, business schools, etc. (Flores-Bueno and Jerez 2023; Ayyash, McAdam, and O'Gorman 2022).   In each case, depending on the country, the socioeconomic context, and other factors, there will be differences between them. However, business incubators are frequently non-profit entities (Blanco Jiménez et al. 2023) aimed to support entrepreneurs from the initial idea to their full establishment in the market.

Business incubators (BI) showed high heterogeneity among them. We have found a great diversity of entrepreneurial ecosystems; with marked differences in the technology use, knowledge capital (Kapasi and Galloway 2019); the availability of spaces of knowledge, resource heterogeneity and capital formation (Kitagawa and Robertson 2012 its university orientation, with two competing narratives, commercial and educational (Nicholls-Nixon and Valliere 2020);   van Weele et al. (2020) indicated that the heterogeneity of BI is conditioned by the availability of tangible and intangible resources. In this sense Ayyash, McAdam, and O'Gorman (2022) provided a more nuanced understanding of the heterogeneity that underlies the organizational form referred to as a BI.

Business incubator classification helps optimize performance by aligning client selection criteria with program objectives, uniqueness of ideas, and standard selection tools ensuring the startups receive the right support to thrive (Ramar and Magheswari 2023). Furthermore, business incubators play a vital role in economic development by supporting startups, providing resources and facilitating financing, which in turn contributes to job creation and wealth generation (Shekapure et al. 2024). Besides, the efficiency of economic development relies on the improvement of business infrastructure, where business incubators serve as a key element, offering diverse support to businesses at different stages of development (Almeida et al. 2021). Apart from this, business incubators are seen as future educational and learning centers, nurturing small businesses and preparing young people for the challenges of the global market, emphasizing the importance of their classification for tailored educational and training programs (Diawati and Sugesti 2023).

Several references on business incubators were found (Centro de Información y Red de Creación de Empresas), although few were focused on the phases that make up business incubators and the business model (Breivik-Meyer et al. 2020; Niammuad et al. 2013).   To deep knowledge of it is of great interest as the incubation phases could be associated with the viability of the ventures (Paoloni and Modaffari 2022). In this sense, when it comes to incubator business models, the nuances of the value creation perspective are largely ignored and treated as a "black box" (Gómez 2002).

This paper outlines a means by which the heterogeneity of business incubators can be quantified according to the diversity that can be viewed. The main purpose is offering a new perspective for the study of BIs that focuses on their heterogeneity during the incubation process.

The EU (DG XVI) defined business incubators as public and private interlocutors, which develop a complete and integrated system of activities and services of excellence for small and medium-sized enterprises, with the aim of creating and developing innovative activities (Morales et al. 2019).

Business incubators provide entrepreneurs with information, advice, management guidance, accommodation spaces; whether shared (pre-incubator or coworking) or individual (office), training programs, networking, events and connection activities, networks of mentors and other resources, and have become an important element of the business ecosystem, contributing greatly to the generation of value (Cabrera Soto and Souto Anido 2023; (Vaz, de Carvalho, and Teixeira 2022).

A strategic objective of the incubators was to facilitate the ideal framework for the creation, development, and maturity of business initiatives. They provide services to their clients and configure an ecosystem that increases the chances of success and venturer's survival. Through incubators, companies receive training, advice, technological and financial links at their initial stage, a time of greatest vulnerability (De Esteban et al. 2022). In addition, the incubator promotes the

culture of innovation, business promotion and the training of new entrepreneurs. (Chaves-Maza and Fedriani 2022).

The success of a BI is measured by the survival rate of the companies incubated or hosted in it (Díaz, Anido, and Martínez 2019). According to the Small Business Administration in the United States (2008) the success rate of incubated companies was 80%, while this percentage dropped to 38% in startups not incubated in a BI (Díaz Macías and Mora Macías 2019). In this sense, ventures linked to incubators showed a greater probability of survival (Paredes, Peñaloza, and Rivera 2020). According to the National Business Incubation Association (NBIA), BI is an efficient and dynamic process that provides managerial help, aimed at obtaining economic resources and exposure to "Critical Business" that reduces between 10% and 15% the failure rate in the early stages of the company (Díaz Macías and Mora Macías 2019).

Several authors considered the role of business incubators to be positive in the economic transformation of territories (Paredes, Peñaloza, and Rivera 2020; Paz 2022). In addition to promoting the strategy of support lines for entrepreneurs, they also function as a canter of attraction, retention, and expansion of companies. BI develop services for entrepreneurs and act as a focus for innovation of new projects, products, and services. The coordination of the different BI favours an efficient system of aid to entrepreneurs that guarantees a dynamic and sustainable flow (Ramírez, González, and Tene 2020).

The detailed description of the bibliography about the BI stages, shown below, helped us identify those key variables of each incubation phase, for later use in the survey and in the construction of the typology. According to Blanco Jiménez et al. (2023); Lúa, Martínez, and Fontes (2020), and Rudawska (2020) there are different phases that the entrepreneur goes through in the business incubator: Phase 1. Initial advice, First contact. Doubts are resolved, the idea is presented, the resources available are optimized, etc. It is accessed through the appointment service. Phase 2. Pre-incubation, in this phase the business plan is carried out in an interval of 4 to 6 months and with a technical advisory team. On the one hand, in the early stage of launching a project is where the idea is generated, the business model and the value proposition are defined. On the one hand, in this stage the commercial and business opportunities are assessed (Zuluaga and Morales 2016), but on the other hand, in this phase the abandonment rate is higher (Hackett and Dilts 2004).

Once the pre-incubation phases and the Business Plan are completed, the "birth of the entrepreneurship" begins, where it reaches a legal entity to operate in the market. Incubators facilitate the establishment of the company, streamlining administrative procedures, with a reduction in time and costs (Hausberg and Korreck 2020). After the establishment of the venture, the Incubation phase begins. Incubation is divided into two phases, depending on the services provided by the incubator: basic and advanced incubation. Phase 3. Basic Incubation, in this stage the incubator provides spaces (coworking), infrastructure, tools, resources and contacts necessary for the creation and development of products and services. Phase 4. Advanced Incubation, the incubators provide additional services to those of the previous phase, such as: training, networking, participation in events, connection activities, mediation, testing laboratories, among others. During this phase, agreements with partners and strategic partners are promoted; both for financing, scaling of production and internationalization of the venture. The services provided by business incubators are variable depending on the type of services, the clients, and the structure of the organization (Deyanova et al. 2022).

Business incubators were differentiated by the services offered; from those focused-on technology, to others focused on business development (Antunes et al. 2020). However, all of them provide active support to entrepreneurs through training, administrative support, office space and infrastructure, technology transfer, assistance to help reduce time to market, consulting services, networking, and the funds needed to help grow the new business (Kasanagottu and Bhattacharya 2018). Since COVID 19, virtual business incubators have proliferated, which support the entrepreneur without providing a physical space to carry out their activity (Handoyo et al. 2021; Reit 2022).

Finally, the startups will abandon business incubators, and the incubation process will be assessed through the viability of the company. Graduation rate is the response variable most frequently used to measure incubators' success (Tang et al. 2021).

The effect of business incubators on the ventures' success has been widely analyzed, but there is a gap regarding the role played by the incubation phases. In this sense Alayoubi et al. (2020) related the effect of knowledge of strategic objectives on the achievement of technological innovation at the Palestine Technical College. The reported results indicated a strong positive increase in the strategic requirements and the innovation achieved (leadership, pioneering thinking, pioneering culture, strategic resource management).

Shehada et al. (2020) were focused on how to improve the performance of business incubators in the Gaza Strip. Owda et al. (2019) identified personal variables and their effect on promoting job creation in the Gaza Strip through business incubators. In this case, the researchers analyzed 92 projects located in business incubators in the Gaza Strip, addressing the study of gender and technical knowledge.

Benavides-Sánchez et al. (2023) studied business incubators and the role developed by universities as a catalyst between student entrepreneurs, teachers, researchers, and investors. The need was found to build multidisciplinary work teams, with collaborative work networks.

Habiburrahman et al. (2022) delved into the concept of incubators and identified critical success factors, such as synergistic products, processes, innovation management, communication, culture, experience, information technologies, innovation skills, functional and implementation skills. The eleven factors were similar in incubators and startups, although with a different order of priority.

Consequently, business incubators constitute key elements in the creation of firms and are fundamental for business development (Mecha-López and Velasco-Gail (2023); Leal et al. 2023), sustainable development (Ballering and Masurel 2020), and territorial cohesion (Toril and de Pablo Valenciano 2009; Gail and López 2021; Mas-Verdú et al. 2015). Likewise, it is complex to quantify the success of business incubators, because there are different metrics, indicators and approaches, such as: business innovation (Lian 2020), efficiency (Ramírez González 2017), performance (Al-Mubaraki and Wong 2011), the entrepreneur's perspective (Antonovica, de Esteban Curiel, and Herráez 2023), among others.

However, there are few studies that analyze business incubators with the incubation phases approach (Olmedo et al. 2023; Velasco Uribe 2020). In this research we considered the business incubators in Spain globally, assuming their diversity, and their stage of development. Their grouping according to their variability and the incubation plan they are developing is of great interest; both for the development of in situ improvements and for the development of specific sectoral policies that enhance their development (Arribas, Novales, and Vicente 2021) and improve survival or graduation rates (de Esteban Escobar 2020).

The objective of this work was to classify business incubators in Spain according to their heterogeneity during the incubation process phases. Therefore, this research seeks to deepen knowledge of the stages that startups go through in business incubators, its organizational model, and which the differentiating factors were. For this purpose, a typology of business incubators in Spain was developed in relation to the incubation phases of the startups, and they were subsequently characterized.

The business incubators were classified according to the indicators of the different phases of the incubation process: 1: Spreading Entrepreneurship; Phase 2: Pre-incubation; Phase 3: Basic-Incubation and Phase 4: Advanced incubation. The groups achieved showed high homogeneity within the group and heterogeneity between then.

In a second stage, a characterization of the incubator types was carried out with the graduation variables and other operational variables.

This research will allow to classify the business incubators, grouping the different types of incubators existing in Spain according to its four incubation phases (Spreading entrepreneurship, Pre-incubation, Basic incubation, and Advanced incubation).

Deepen in the knowledge of the variability reasons will allow developing improvement actions acting on the key organizational factors. Additionally, this work will serve to promote appropriate and specific policies and strategies for each business incubator identified group. Likewise, its subsequent characterization favors the association of the groups with the results and the remaining operational variables (dimension, profile, etc).

The variables involved in the classification of business incubators are applicable in any country, so the results could be extended to other scenarios, although modulated by the different socioeconomic context.

After this introduction, this article will be organized as follows: in section 2, the methodology will be presented including the the population, the survey applied, and the multivariate statistical analysis used. In section 3, the results will be described, firstly the typology of business incubators and then its characterization. Section 4 will provide a discussion of the results. To end, section 5 will describe the conclusions, the limitations of the study and future lines of research.

2. Materials and Methods

For the drafting of this work, the surveys that were sent to all the business incubators in Spain were used for the preparation of the Funcas report "The services provided by incubators and accelerators of companies in Spain. Ranking 2022/2023". Funcas is a center of analysis -a think tank-dedicated to economic and social research and its dissemination, promoting the interaction between the academic sphere and the real economy. It is part of the CECA Social Work.

Funcas has been, for many years, a benchmark in the field of economic forecasting and in the analysis of Spanish and EU public policies. At present, the Foundation is also very active in the field of finance – financial regulation and digitalisation, financial markets... – and in a variety of social issues.

The Funcas ranking on business incubators and accelerators, which has taken ten editions, becomes a benchmark in the analysis of best practices in business incubators and accelerators in Spain.

2.1. Population and Survey

412 business incubators from Spain in 2022 were taken as population [60]. 88 business incubators that participated in the Funcas' report (21.36 % of the whole) were selected. Data were collected by using Funcas' survey applied in Spain in 2022. The survey included 62 questions relating to the following aspects: operative and general data (20 items), phases of the business incubators (33), and survival's indicators (9) (Survey applied in Table S1).

This research was carried out in several steps: questionnaire design, data collection, and finally the data analysis. Based on the literature review, key indicators of the business incubators were identified, and a set of variables was collected suitable for answering the research questions. During this stage, inclusion of each item was assessed by the research group.

Subsequently, the questionnaire was applied using the following procedure: The survey was sent to the person in charge of each incubator, including an email and telephone number. In parallel, the manager was contacted, explaining the importance of the questionnaire and how to answer it. Doubts and the interpretation of the items were also solved. From there, a regular relationship usually arises, with constant feedback, improvements to the questionnaire were proposed, important information for both parties that should appear in the final reports was highlighted, among others. Thanks to this relationship, it has been possible to maintain the FUNCAS questionnaire actively over time.

Table 1. Business incubation phase variables.

Variable	Variable description
SPREADING ENTREPRENEURSHIP (SP)	
1.Advice	Provide an information and advisory service to the general public.

2.Advice$_{free}$	Offering a service for free.
3.Advice$_{nb}$	How many events does the incubator perform per year?
4.Events	Does the business incubator hold events that aim to spread the entrepreneurial spirit?
5.Nb$_{y}$	How many events does the business incubator hold per year?
6.Channels	Are there channels of information/communication/promotion of services?
7.Publicat$_{Frec}$	Publication frequency in communication channels.
8.Traing	Offering transversal courses and entrepreneurship support courses.
9.Traing$_{Frec}$	Number of courses offered per month.
PREINCUBATION (PRE)	
10.Shar$_{spac}$	Existence of business pre-incubator or coworking facility
11.Spac$_{free}$	Existence of free spaces to work
12.Space$_{req}$	Are there any requirements to enter the preincubation phase?
13.Proj$_{nb}$	Number of pre-incubated projects per year.
14.Proj$_{advice}$	Having expert consulting sessions for pre-incubators.
15.Proj$_{mon}$	There is monitoring of pre-incubated projects.
16.Proj$_{traing}$	There are cross-sectional training workshops.
17.Proj$_{Mtime}$	Number of years spent in preincubation stage.
18.PAE	Is the business incubator an Entrepreneur Care Point (PAE)?
BASIC INCUBATION (INC)	
19.Entry	There are selection criteria for access to incubation.
20.Entry$_{crit}$	Which are the selection criteria for access to incubation?
21.Servic	Services included in the rate.
22.Nt$_{Frec}$	Frequency of networking meetings.
23.C$_{Frec}$	Frequency of consultancy sessions.
24.Ment$_{Frec}$	Frequency of mentoring sessions.
25.Mon$_{Frec}$	Frequency follow-up or monitoring sessions.
26.Traing	Offer of training courses adapted to the needs of clients.
27.Traing$_{nb}$	Number of courses offered per month.
ADVANCED INCUBATION (ADV)	
28.Nc$_{agree}$	Interest groups with which the incubator has an agreement/collaboration agreement.
29.Comp$_{exp}$	Percentage of hosted companies exporting their products.
30.Comp$_{fd}$	Number of hosted companies that have raised funding while hosted.
31.Comp$_{job}$	Average number of jobs generated by the hosted companies.
32.Inc$_{disc}$	A special rate is offered on technology services or products.
33.Inc$_{agree}$	Interest groups with which the incubator has an agreement/collaboration agreement.

Table 2. Outcome and operative's variables of incubators.

Variable	Variable description
GRADUATION (GRD)	
34.Agree	Does the incubator have agreements to facilitate the installation of companies abroad once outside the nursery? 0, No; 1, Yes
35.Crit	Graduation criteria. 1, Non-compliance with objectives and others; 2, Limited period of time; 3 Meeting objectives
36.Com$_{nb}$	Total number of companies graduated since the incubator opened. 1, <10; 2, 10- 50; 3, 51-100; 4, >100

37.Com$_{Iv}$	Of the graduate companies, what is the percentage that continues their activity abroad now? 1, <25; 2, between 26-50; 3, 51-75; 4, >76
38.Com$_{dd}$	Percentage of companies that ceased their activity during their stay. 1, >76; 2, between 51- 75; 3, 26-50; 4 <25
39.Com$_{fd\_Pb}$	Percentage of graduates who have obtained funds/public funding. 1, <20; 2, between 21-40; 3, 41- 60; 4, 61-80; 5, >81
40.Com$_{fd\_pr}$	Percentage of graduates who have obtained funds/private funding. 1, <20; 2, between 21-40; 3, 41-60; 4, 61-80; 5, >81
41.Mon	Contact with graduates is maintained. 0, No; 1, Yes
42.Mon$_{act}$	There are specific actions/initiatives with the graduates. 1, Nothing specific is done or frequent contact with them is maintained; 2, Survival and Evolution Tracking; 3, Networking events between graduates and entrepreneurs/professionals of interest; 4, Trainers/Lowers of Hosted Enterprises; 5, Networking meetings or events between graduates and hosted.
OPERATIVE **(GA)**	
43.Network	Belong to a network. 0, No; 1, Yes
44.Offices$_{nb}$	Capacity of the incubator (Nº of offices). 1, <10; 2, 11-20; 3, 21-30; 4 >30
45.Newslett$_{Frec}$	Shipping Frequency. 1, Not send; 2, Quarterly; 3, Monthly; 4, Weekly
46.Staff	Staff required for daily operations (N° persons). 1, <3; 2, 4-5; 3, >5 persons
47.Expenses	Annual operating expenses budget (€/y).
48.Revenues	Annual operating revenue budget (€/y).

2.2. Statistical Analysis

In a first stage, 33 business incubators phases' variables were selected (9 items linked to phase 1 of Spreading, 9 to phase 2 of Pre incubation enterprises, 9 associated to phase 3 of Basic incubation phase and finally 6 items to phase 4 of Advanced incubation). According to Niammuad et al. 2013 the criteria of coefficient of variation higher than 60%, uncorrelated variables and non-linear dependence, for the selection, of the variables were considered. A principal component analysis (PC) was used to reduce the number of variables and summarise most of the variability (Capatina et al. 2023). Based on the partial correlation matrix and the initial PC models, the number of variables was reduced to 23. In this research, 8 factors were selected, the orthogonal varimax rotation was applied to relate more easily the selected variables to the extracted factors. The Bartlett sphericity test and the Kaiser-Meyer- Olkin index KMO>0.7 (Gelasakis et al. 2012).

In a second stage, the business incubators were classified using cluster analysis. Firstly, hierarchical groupings were developed based on Ward's method, using the Euclidean, squared Euclidean and Manhattan distances. The optimal number of clusters was selected using the Elbow method (Syakur et al. 2018; Shi et al. 2021). The clustering method whose discriminant function correctly classified the highest percentage of cases was chosen, and it generated significant differences in the largest number of original variables.

Additionally, the characterization of the business incubators was carried out using the preliminary variables (Table 2). Quantitative variables (original and adjusted) were analyzed by means of a one-way analysis of variance (ANOVA) and Tukey's multiple range test. Qualitative variables were compared with the Chi^2 test. All statistical analyses were performed using the Statgraphics Centurion versión XVI.1. software https://www.statgraphics.com/download-statgraphics-centurion-xvi

3. Results

3.1. Typology of Business Incubators

- Principal Component Analysis (PC)

8 factors were extracted, corresponding to an eigenvalue greater than 1 (Niammuad et al. 2013). These factors explained 73.47% of the data variability. Table 3 shows the matrix of factor loadings

after rotation. 21 variables were selected in the PC analysis of the 33 business incubators variables, which were exclusively assigned to one extracted factor.

The first factor explained 32% of the variance and grouped variables related to Phase 2 of business preincubation. The variables with a strong degree of association were Pre_proj_mon and Pre_proj_advice. These variables are related to carrying out monitoring and follow-up of the projects, having experts in project development. The variables that showed a moderate link with the factor were the transversal training of the incubator (Pre_proj_traing), the number of projects incubated per year (Pre_proj_nb) and the existence of coworking in the business incubator (Pre_shar_spac). All these variables were linked to phase 2 of the incubators or Pre-incubation.

The second factor picked up 9.91% of the explained variance and grouped 4 variables: two corresponding to Phase 1 of the incubation, relating to the dissemination of information, transversal training, and its frequency (Sp_Traing and Sp_Traing_Frec). The other two variables that made up the factor were linked with basic and advanced incubation. One from phase 3 of basic incubation of startups: number of courses offered per month (Inc_traing_nb) and another from phase 4 of advanced incubation related to the number of agreements with other entities (Adv_inc_agree). This factor was related to training and the degree of collaboration offered by the business incubator.

The third factor explained 6.65% of the variance through variables strongly associated with Phase 3 of incubation, with coefficients greater than 0.7. The variables identified were: Frequency of consulting sessions (Inc_c_Frec), frequency of mentoring sessions (Inc_ment_Frec), and frequency of entrepreneurship monitoring follow-up (Inc_mon_Frec). They are variables linked to the monitoring and control of activity. The first three factors explained 48.7% of the accumulated variance and collected 12 variables.

Factors 4, 6 and 7 collect the variables from phase 1 of the startup incubation and were linked to the spreading entrepreneurship. These three factors only explained 15% of the variability and will be related to spreading. The rest of the factors, from the fourth to the eighth, individually explained a percentage of variance of less than 6% and were associated with one or two variables directly. The values of the variables used in the equation were standardized by subtracting their means and dividing them by their standard deviations. Also, as it is shown in Table 3, the communalities considered as estimators of the proportion of variability in each variable attributable to the extracted factors are shown (Niammuad et al. 2013 ; Capatina et al. 2023).

Table 3. Principal components (PC) loading matrix of rotated.

Items	Loading	Eigenvalue	Explained variance (%)	Acumulate	PC
10.Shar_spac	0.61	8.00	32.01	32.01	1
13.Proj_nb	0.68				1
14.Proj_advice	**0.82**				1
15.Proj_mon	**0.83**				1
16.Proj_traing	0.65				1
8.Traing	0.62	2.47	9.91	41.91	2
9.Traing_Frec	0.77				2
26.Traing	0.70				2
32.Inc_disc	0.64				2
23.C_Frec	0.76	1.71	6.86	48.77	3
24.Ment_Frec	0.71				3
25.Mon_Frec	0.76				3
6.Channels	0.71	1.37	5.46	54.22	4
7.Publicat_Frec	0.67				4
22.Nt_Frec	0.72				4
19.Entry	0.84	1.36	5.43	59.65	5

20.Entry_crit	0.86				5
1.Advice	0.82	1.26	5.03	64.68	6
3.Advice_nb	0.63	1.13	4.52	69.20	7
18.PAE	0.80				7
11.Spac_free	0.91	1.07	4.27	73.47	8

- Cluster Analisys

The scores of the eight factors selected for each of the business incubators analyzed were used as independent variables. This statistical procedure generated 3 clusters from 76 observations provided (Figure 1). The clusters obtained showed homogeneity within the group and heterogeneity between them. The procedure began with observation in separate groups that were subsequently grouped into close pairs to form a new group (Shi et al. 2021). After recalculating the distance between groups, the two now closest groups are combined. This process was repeated until finally reaching the three groups shown in Figure 1. The number of clusters was selected based on the distribution of the data, the experience of the analyst and the congruence of the results (Syakur et al. 2018).
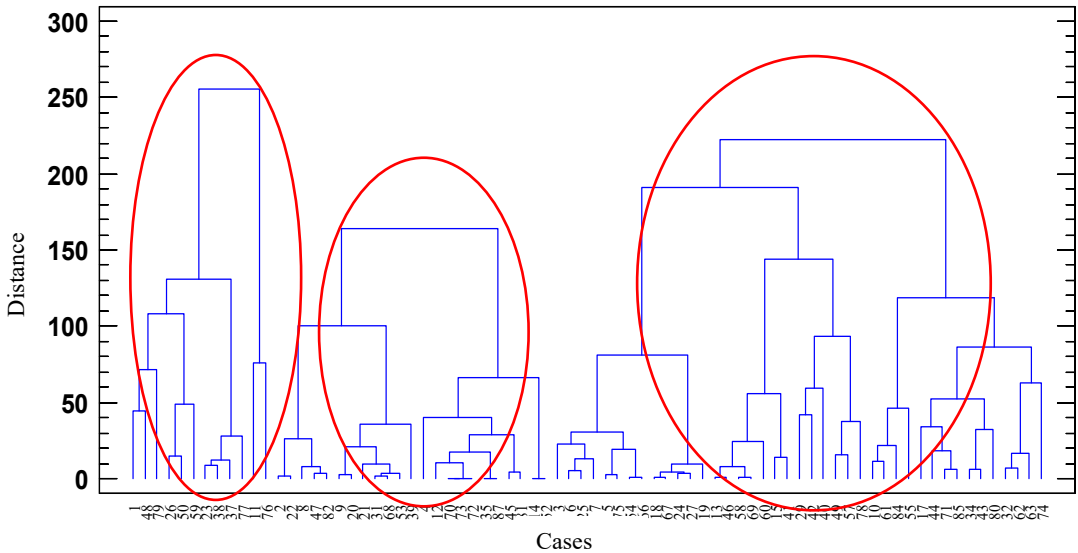

Figure 1. Clusters of business incubators.

Table 4 shows the scores obtained by the centroids of each group and disaggregated by factors. Likewise, Figure 1 shows the dendrogram. Through cluster analysis, 3 groups were obtained; the first with 16% of the business incubators, the second with 30% and the third with 53% of the cases.

Table 4. Scores of centroids for each cluster.

PC	Cluster		
	1	2	3
1	-7.4766	4.1812	-0.1573
2	-8.2974	3.9628	0.2054
3	-6.2827	1.4973	0.9989
4	-5.5285	2.8182	0.03716

5	-2.5355	2.4939	-0.6569
6	-3.5733	1.5787	0.1602
7	-2.7583	1.9444	-0.2835
8	-0.9970	0.4338	0.0485

Group 1 is a minority (15.79% of cases); In this group, business incubators were incorporated with very low and negative values regarding preincubation (Phase 2), negative values of training and collaboration (Spreading Phase) and strong negative values regarding the monitoring and control of the ventures (Phase 3). The business incubators included in Cluster 1 would have to focus their efforts on improving the practices included in Phase 2 and 3 of the incubation. It is recommended to start improving services from the variables identified in Table 3.

Group 2 represented 30.26% of the business incubators. They were incubators that show the highest values in Pre-incubation (4.2), Training and collaboration (4.0) and Incubation (1.5). This group was the leading group, although the values were high in these factors, they should focus their efforts on improving Phase 3 and other variables linked to the remaining factors (Table 3).

Group 3 was made up of 53.95% of the cases. With intermediate values between the previous groups. Negative values or values close to zero stand out in the first three components, which are the most relevant (Table 3). The practices associated with the variables of phases 2, 1 and 3 of the incubation form their strategic improvement objectives.

The construction of the typology and knowledge of these groups is necessary to propose specific measures for each of them, seeking their strengths and weaknesses and how to correct their behavior in the most effective and appropriate way (Paz 2022; Niammuad et al. 2013).

3.2. Characterization of the Typology of Business Incubator

31.58% of business incubators had a network to share data and resources, compared to 68.42% that did not offer the service ($p < 0.05$). Incubators with networks were mainly distributed in clusters 2 and 3 (Table 5). The strength of network connections over time is associated with business benefits (van Rijnsoever 2020).

Table 5. Incubator typology's characterization according to qualitative variables.

Variables		Cluster			
		1	2	3	*p-Value[1]*
43.Network (%)	0	10.53	5.26	15.79	*
	1	5.26	25,00	38.16	
44.Offices_nb	1	9.21	5.26	17.11	*
	2	1.32	7.89	22.37	
	3	2.63	6.58	6.58	
45.Newslett_Frec (%)	1	14.47	2.63	18.42	***
	2	0.00	0.00	0.00	
	3	1.32	1.32	1.32	
	4	5.26	5.26	5.26	
46.Staff	1	1.32	1.32	1.32	***
	2	0.00	0.00	0.00	
	3	0.00	0.00	0.00	
	4	14.47	14.47	14.47	
34.Grd_agree (%)	1	15.79	15.79	15.79	*
	2	15.79	15.79	15.79	
41.Grd_mon (%)	1	7.89	7.89	7.89	**
	2	1.32	1.32	1.32	
42.Grd_mon_act (%)	1	12.00	12.00	12.00	***
	2	4.00	4.00	4.00	
	3	24.00	24.00	24.00	
	4	2.67	2.67	2.67	

| | 5 | 2.67 | 2.67 | 2.67 |

[1]*p-Value: *p < 0.05; ** p < 0.01; *** p < 0.001*

The variable size of the business incubator (44.Offices_nb) showed significant differences by cluster (p < 0.05) (Table 5). Incubators with the largest size and greatest capacity to host ventures were concentrated in cluster 2 and, secondarily in cluster 3. On the contrary, the smallest incubators correspond to cluster 1 and to a lesser extent a business incubators group of cluster 3. The size of the business incubator is a variable of great importance (van Rijnsoever 2020) and is also related to the survival rate (Klingbeil and Semrau 2017).
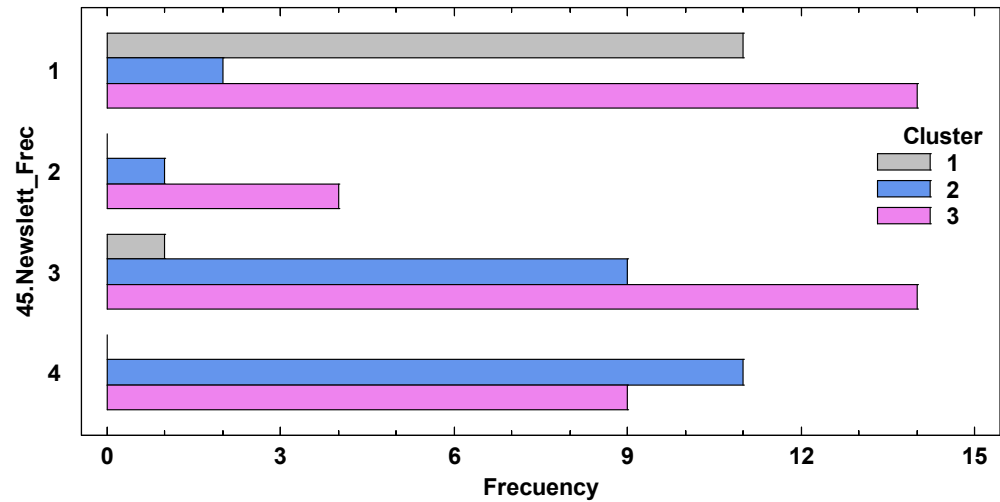
Figure 2. Newsletter frequency according to cluster.

The variable frequency of communication between the business incubator and the startups for each cluster (45.Newslett_Frec) obtained significant differences with a high level of confidence (p < 0.001). The startups in cluster 1 did not have frequent communication in 35.53% of the cases and similar behavior in large part of startups from cluster 3 was observed. On the contrary, in cluster 2 the incubators with high (3) and very high frequency of communication (4) were concentrated (Table 5 and Figure 2). According to Paniagua-Rojano (2022) the frequency of communication and the type of communication, according to the theory of dynamic capabilities, was linked to an increase in business results (Bastanchury et al. 2019).

Figure 3 shows the classification of business incubators according to the number of people that make up the operational staff (46.Staff) and the cluster. Significant differences are obtained with a high level of significance (p < 0.001) (Table 5). 77.64% of the incubators were very small size. They had, at most, one person on the staff for their daily operation. On the other hand, the largest incubators, with more than five people for their operational operation, represented 14.47% of the total.

The business incubators belonging to cluster 1 showed very low dimensions with respect to the number of people, while in cluster 2 those with a greater organizational structure were concentrated. These results were significant and are associated with the viability of the startups (Oh, Chang, and Jung 2018; Almeida et al. 2021).
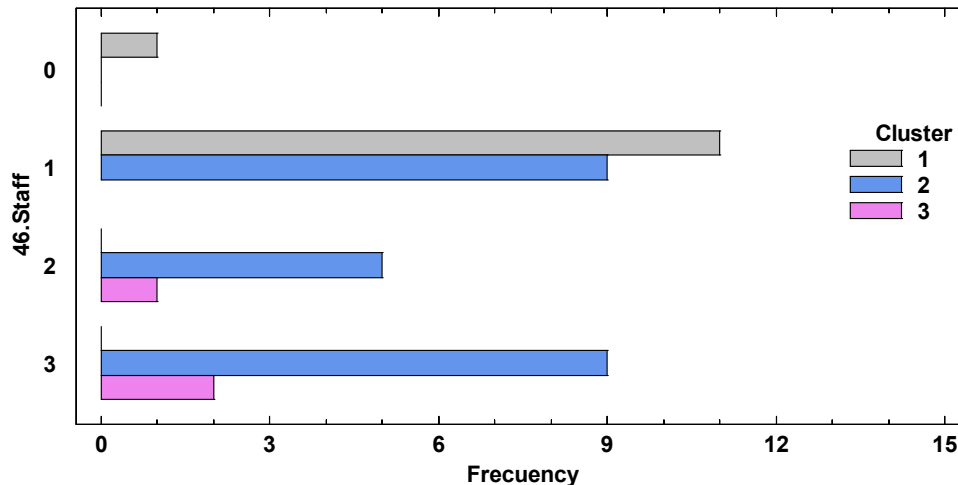
Figure 3. Organizative staff size according to cluster.

The graduation or survival rate was used in this research as a response variable for the business incubators. Tables 5 and 6 show the main economic results and the graduation rate of the incubators regarding to cluster. 89% of the incubators declared that the startups housed in their facilities did not generate profits, compared to 10% that did declare profits. Regarding costs, the results reported that 82% of the cases showed high fixed costs, compared to 13% with a predominance of variable costs. The predominance of the variable cost structure was mostly associated with the incubators of cluster 2, in 40% of the sample. The results were according to Lukes et al. (2019).

The graduation rate was evaluated based on the indicators in tables 5 and 6. The first one that showed significant differences ($p < 0.05$) was the existence of protocolized agreements that facilitate the installation of the company outside the incubator (34.Grd_agree) (Table 5). 67% of the incubators did not have these agreements and were grouped entirely in clusters 1 and 3. On the contrary, the incubators with protocolized agreements were located in cluster 2 and slightly in cluster 3. Authors such as Peña Ramírez et al .(2019) indicated the importance of these agreements for the development and growth of startups.

Table 6 shows how the clusters were characterized based on the general and quantitative graduation variables. ANOVA and Tukey's multiple range test were used to differentiate means.

Table 6. Incubator typology's characterization according to quantitative variables.

Variable	Clúster			p-Value [1]
	1	2	3	
37.Grd_com_Iv	2.67 [a]	3.30 [b]	3.46[b]	*
40.Grd_com_fd_pr	1.75[ab]	2.30[b]	1.54[a]	*
47.Expenses	25,056[a]	865,224[b]	156,342[a]	*
48.Revenue	36,700[a]	801,381[b]	168,867[ab]	*

[1]p-Value: *$p < 0.05$

The variable 37.Grd_com_Iv was linked to the monitoring of the venture once it leaves the incubator. In 76% of the cases, the startups maintained contact with the incubator, while 24% did not. The results showed significant differences between clusters ($p < 0.01$) (Table 6). The business incubators of Cluster 2 showed greater monitoring of the startups, on the contrary those of Cluster 1 showed the lowest monitoring rates. Pattanasak et al. (2022) reported the great value involved in keeping contact between business incubators and startups alive and dynamic startups.

Subsequently, the clusters were characterized according to the specific activities developed with the graduates (42.Grd_mon_act). Significant difference between clusters were obtained (p < 0.001). In Cluster 2, incubators predominate with regular meetings and networking events between graduates and residents. Hosted Enterprises training is also frequent. On the contrary, in Cluster 1 and 3 there is a frequent absence of specific meetings between graduates and hosts and an absence of improvement in the training of the activity. This *inter pares* training is basic for solving problems in better response times and more effectively (Zapata-Guerrero et al. 2021).

Regarding the viability or survival rate of the companies, once they leave the incubator (37.Grd_com_Iv) by cluster, significant differences were founded (p < 0.05). 62% of companies continued their activity and were viable, with a range of values between 3.30 and 3.46 in clusters 2 and 3. This percentage decreases sharply to 40% in the incubators of cluster 1. The variable 40. Grd_com_fd_pr. represented the percentage of startups that have been financed with private funds, both for investment and Venture Capital. Although the percentage is very low (less than 40%), we found in cluster 2 values much higher than the remaining clusters (p <0.05).

Regarding the budget of income and expenses (Table 6) of the business incubators (47.Expenses), significant differences were observed in cluster 2, with very high values and marking the existence of a scale effect. Thus, the average annual budget in cluster 2 was 856,224 euros, a value much higher than that of the other groups (p < 0.05). Likewise, the annual operating income budget in the incubators (48.Revenue) showed significant differences between clusters (p < 0.05). The incubators in Cluster 2 have a higher level of income (scale effect) than the remaining groups and those in group three showed intermediate values between Cluster 1 and 2. In cluster 3 we found business incubators with a low level of expenses and an intermediate level of income. It could indicate the existence of a group of small size but economically efficient business incubators. Results were similar to founded by Funcas´s ranking 2022/2023 (Blanco Jiménez et al. 2023)

4. Discussion

The progress of startups in business incubators was segregated into four phases: Spreading, Pre-Incubation; Basic Incubation and Advanced incubation (Blanco Jiménez et al. 2023) In this research, 33 variables were used that have different effect on the incubators' success; Spreading (9), Pre-Incubation (9); Basic Incubation (9); and Advanced incubation (6). In addition, a group of response variables were selected, related to the survival rate of the startups (9 variables) and 20 general or operational variables were considered for characterization.

4.1. Variable Identification

Identification of variables was done by using Principal Components Analysis (PC), the factors responsible for heterogeneity during the incubation stage of the startups were identified. 33 initial variables were analyzed on the partial correlation matrix and the preliminary models, in order to reduce the number of variables. The principal components analysis verified, on the one hand, the goodness of each of the proposed variables and secondly, its reduction to eight factors or latent variables that explained 73.47% of the existing variability. The first factor was strongly linked to Phase 2 of Pre-Incubation, the second factor was associated with the variables of Phase 1 of incubation (Spreading) and the third factor was related to Phase 3 of incubation (Basic Incubation). These three factors explained 41.91% of the variance. The remaining factors were mainly linked to phase 1 of Spreading.

First factor obtained, was linked to preincubation variables and was focused on an incubation's short phase with a duration between 4 and 6 months. However, this factor strongly explained the high variability between business incubators in Spain. On the other hand, it was associated with the graduation rate and survival of startups. In this phase the entrepreneur is carrying out his Business Plan with the support and advice of the business incubator technicians. Entrepreneurs in this phase were also offered expert advice and information on financing sources (Blanco Jiménez et al. 2023).

The appropriate building of the Business plan was positively associated with the survival of the startups and their viability in the market (Gaytán Cortés 2020).   The business plan is a tool that makes

it easier for organizations to chart a route to achieve objectives, consider obstacles and propose solutions for the development of activities in the future (Pico, Montalvo, and Pallerols 2023). Likewise, the Business plan helps to forecast a contingency plan in the event of possible disturbances (Alonso González 2023; Becerra Ardila, Arenas Díaz, and Aguilera Monroy 2023). Also, the results indicated the importance of a competitive operative staff in this first phase of preincubation of startups.

The second factor obtained in the analysis of principal components was the diffusion of the entrepreneurial spirit (Spreading). According to Funcas (Blanco Jiménez et al. 2023). incubators in this phase constitute a reference for startups, offering expert support, training sessions, social networks, training in tools, among others (Lian 2020). Although it is a priority for entrepreneurs to discover the link between the startup and the incubator and how this alliance contributes to graduation (Blanco Jiménez et al. 2023), it is a phase of information gathering, where the entrepreneur has not started the execution of his project, but has gone to the business incubator to resolve doubts, advice and obtain guidance regarding his business idea (Landeros García et al. Jiménez 2021). At this initial moment, the entrepreneur consults with different advisory services and goes to different incubators, so the appropriate approach to the project and his trust in the know-how of the staff constitutes an element of competitiveness compared to other incubators. Quality of the mentoring provided within these incubators depends on the incubator staff, emphasizing their fundamental role in guiding entrepreneurs in business development and strategy formulation(Kehinde et al. 2024);

Regarding the third factor, basic incubation, according to the Funcas ranking, in this phase, entrepreneurs have already matured their business ideas, studied their viability and, therefore, converted their idea into a business project. It is the go to market phase in which the planned project is carried out (Paoloni and Modaffari 2022). It is the most critical stage of an entrepreneur in which entrepreneurs must be provided with an especially favourable growth environment, and a series of specific resources and services must be made available to them, which allows them to successfully reach the maturity of the project. This factor is a priority according to the study by Funcas (Blanco Jiménez et al. 2023), however the results of the research relegated it to third place and it only explained 6.86% of the variability.

The variables that made up advanced incubation did not appear to be very relevant in the study of the phases of startups in the incubator. According to Redondo and Camarero (2017); Romero, Leon, And Castellanos (2020); Salas Laime (2021) and Barrios Zarta and Gómez 2021, in the advanced incubation phase, companies develop internationalization strategies, seek new financing, scale up production and enter a growth phase. During the previous phases, pre-incubation and basic incubation, startups face the "valley of death", a stage in which companies are developing their business project and are not yet solvent, they do not generate enough profits to cover all their costs and that lasts until sales stabilize.

Once this period has passed, around two to three years of life (depending on the economic sector in which the startup operates), the companies begin to scale, so the support of the Business incubators favours the projects, but it is not as definitive for their survival as in the previous stages (Zapata-Molina et al. 2022; Momin, Mehak, and Kumar 2023). At this stage, companies normally need capital to finance their growth or to make the leap into international markets. This capital is not always provided by business incubators, so the importance of the incubator for the survival of the company is not so relevant.

4.2. Bussines Incubators Typology

Three groups or clusters made up the population of Spanish business incubators , which were subsequently characterized with the output variables; both general and graduation. Group 1 (16% of business incubators) was the smallest and had markedly negative values in the centroids with respect to the first three factors. This group represents those incubators with more structural deficits and lower graduation rates. Group 2 (30% of the sample) constitutes the leading group with positive values in all factors and strongly positive in factors 1 and 2. It brings together the largest business incubators and highest graduation rates. The analysis also showed factors where it is necessary to

focus improvements. Group 3 (54%) is an intermediate group with positive values in its factors, although low and close to zero. This group is clearly the recipient of improvement policies and, within it, different strategies are developed.

Deepening the knowledge of the typology of incubators is of great interest because it helps in providing to the startups with resources and support adapted to specific needs. For example, technology-based enterprises (ETBE) often use incubators to control costs and access specialized resources. ETBTs change incubators as their needs evolve, showing the gap between needs and services (Yusubova, Andries, and Clarysse 2019). Incubators offer networking services, capital support and training programs, which are essential for the growth of startups. Besides, specialized incubators encourage knowledge exchange, strong networks and greater network communication capacity (Haider 2023). The type of innovation that business incubators generate also varies depending on the type of incubator. For example, university and private business incubators are more likely to foster technological product and process innovations Ramar and Magheswari 2023). Overall, the type of business incubator (whether commercial, social, university or other) plays a critical role in shaping the resources, support and innovation opportunities available to startups and, and, ultimately, it influences their development and success.

By classifying incubators based on the programs they offer, such as fit with program objectives, uniqueness of ideas, and standard selection tools, incubators can improve their performance and attract investors looking for specific attributes according to investment objectives (Kinya, Wanjau, and Odeyo 2021). This ranking can also serve as a certification of startup quality, increasing the likelihood that venture capitalists (VCs) will fund startups that have been incubated in highly prestigious programs (Manconi et al. 2022; Rukmana et al. 2023) Therefore, strategic ranking and networking of incubators not only improves their operational performance but also improves their funding prospects by adapting to the specific needs and expectations of investors and funding bodies.

4.3. Business Indications Characterization

In this phase, the typologies of incubators obtained based on the operational variables and graduation rate were characterized. When the clusters obtained were face up with the operative variables and those related to the success rate, differences between clusters were found.

Business incubators with better graduation results (Group 2 and 3) showed a higher level of network use, marking significant differences with those of Group 1. On the other hand, those incubators located in industrial and technological parks improve the results. On the contrary, those in the rural world or located in cities decrease their results. The determining factors of success in the startups hosted in the business incubators were linked to the success of the pre-Incubation phase, secondly, the dissemination of the entrepreneurial spirit (Spreading) and the third factor was related to the basic Incubation (Phase 3).

Communication variable determined significant differences between clusters and the results. Communication was appropriate in Cluster 2 and Cluster 3, and poor in Cluster 1. Communication was related to the graduation rate. So, an improvement in communication has an impact on improving results and contributes to avoiding business failure (Nair and Blomquist 2019).

These results were in accordance with analysis of relational coordination (de Esteban Escobar 2020) and Tailored Capabilities Bastanchury et al. 2019). In this sense, this analysis is aligned to the study by Wu (2007), who related internal and external networks with the incubator and business growth. It has been reported a positive correlation between networks, performance, facilities offered by the incubator and link with the university (Kiran and Bose 2020).

The dimension showed significant differences between clusters, so that the small incubators are located in Group 1, the medium ones in Group 3 and the large ones in Group 2. Likewise, the dimension was linked to the graduation rates. That is, the larger the dimension, the structure of the business incubators was modified, and the graduation rate was improved (Bastanchury et al. 2019; Oh, Chang, and Jung 2018). Normally, a larger business incubator will have more capital, more staff and possibilities to support a greater number of entrepreneurs, as pointed out by several authors (Alpenidze, Pauceanu, and Sanyal 2019).

The business incubators of Group 2 and some of Group 3 showed high success rates, and were significantly linked to positive values in: a) the existence of agreements for the installation of the company outside the incubator Breivik-Meyer et al. 2020; b) after-sales service or the regular maintenance of contact between the incubator and the enterprise, once it leaves the incubator (Zapata-Guerrero et al. 2021); c) the existence of training and monitoring actions for graduates (Chaves-Maza and Fedriani 2022; Lian 2020); d) the percentage of ventures financed with private funds (Alpenidze, Pauceanu, and Sanyal 2019); e) high rates of continuity of activity once the incubators were abandoned (Díaz Macías and Mora Macías 2019; Paredes, Peñaloza, and Rivera 2020; de Esteban Escobar 2020; Gaytán Cortés 2020).

Classifying business incubators into different categories helps to understanding the evolution of their social and economic relevance. Furthermore, business incubators have demonstrated important social benefits, especially in the context of the COVID-19 pandemic, by promoting business initiatives that contribute to sustainable economic development and social well-being (Ramar and Magheswari 2023). The role of incubators as social innovations is also highlighted by their ability to support business development with a social purpose, as seen in the case of Kompleks Industri Makanan MARA (KIMAR) in Malaysia, which promotes socio-economic empowerment among indigenous populations (Adham et al. 2019).Furthermore, the potential of business incubators as educational and training centers is emphasized, preparing young people with the skills necessary to thrive in the global knowledge economy and addressing the urgent need to create employment (Diawati and Sugesti 2023). Finally, the economic and social profitability of business incubators is recognized, with studies showing that society recovers its investment several times over through taxes, underscoring their financial viability and the need for continuous improvement in their operations. (Sentana et al. 2018). Therefore, typifying business incubators not only helps optimize their functions but also highlights their multifaceted impact on economic growth, social innovation and educational development.

The efficiency of business incubators is closely linked to their ability to adapt to a changing environment. Incubators should consider multi-sector approaches, provide extensive financial and educational support, and align with the digital economy. Furthermore, the organizational model highlights the need for robust information management systems to support decision-making and strategy to improve process efficiency.

5. Conclusions

This research has allowed us to deepen in the knowledge of business incubators during the startup incubation phases.

The first research problem was the high diversity of business incubators and heterogeneity in the organizational process. In this sense, the application of multivariate analysis (Principal components and cluster) in the four startups incubation phases (Spreading, Pre-incubation, Basic incubation, and Advanced incubation) reduced the dimensionality and grouped 74% of the variance into 8 factors. Main components analysis Factor 1 was positively related to Pre-incubation variables, factor 2 was linked to training and collaboration variables within the Spreading phase. Factor 3 was called monitoring and control of activity and was related to variables from phase 3 or basic incubation.

The second goal was to build a typology of business incubators in Spain. The typology favoured the grouping of the business incubators into three clusters. Cluster 1 (16% of the total) collected incubators with great deficit in phase 2, phase 1 and phase 3.

Finally, the types of business incubators were characterized. Small size incubators were predominant, frequently located in rural areas or cities, and have a low graduation rate. Cluster 2 (30%) incubators with a very high graduation rate, and strongly positive values in factor 1 and 2. In this group factor 3 was positive although susceptible to improvement. They are the largest size incubators and were usually located in industrial and technological parks. Cluster 3 (54%) is the majority, with intermediate values. They showed intermediate size and their begins with factors 1

and 2. In this group there are some very efficient incubators, with medium size and high graduation rate.

The results of this work will serve to focus business incubators on the variables and activities that have a greater contribution to the successful development of the entrepreneurs advised and the companies incubated or hosted therein optimizing the resources used and maximizing their profitability.

Furthermore, knowing which group each business incubators is located favors the development of specific public policies according to their problems. Simple factors were also identified that could be modified and lead to an improvement in the graduation rate.

In subsequent studies, it is recommended to deepen in: a) the quantitative knowledge of the relationship between incubation phases and graduation rates b) The relationship between different businesses incubation phases. Both goals could be addressed with statistical techniques such as Structural equation modelling by the partial least squares method (PLS-SEM).

References

Adham, Khairul Akmaliah, Nur Sa'adah Muhamad, Mohd Fuaad Said, Shahrizin Abdul Sarhadat, Habib Asaril Ismail, and Mohd Fareez Assrul Mohd Nasir. 2019. "Diagnosing Business Incubation for Social Purpose: A Viable System Model Approach," *Systemic Practice and Action Research* 32, (2): 219–38. https://doi.org/10.1007/s11213-018-9465-8.

Al-Mubaraki, H, and Siew Fan Wong. 2011. "How Valuable Are Business Incubators? A Case Illustration of Their Performance Indicators." *European, Mediterranean & Middle Eastern Conference on Information Systems 2011 (EMCIS2011) May 30-31, 2011, Athens*, Greece In. Vol. 30. 30.

Alayoubi, Mansour M, Mazen J Al Shobaki, and Samy S Abu-Naser. 2020. "Requirements for Applying the Strategic Entrepreneurship as an Entry Point to Enhance Technical Innovation: Case Study-Palestine Technical College-Deir Al-Balah," International *Journal of Business and Management Invention (IJBMI)* 9, (3): 1–17.

Almeida, Rita Isabel da Silva, António Pedro Soares Pinto, and Carla M Ribeiro Henriques. 2021. "The Effect of Incubation on Business Performance: A Comparative Study in the Centro Region of Portugal," *Revista Brasileira de Gestão de Negócios 23, 23: 127–40.*

Alonso González, José Manuel. 2023. "Plan de Empresa:Tecnoinver."

Alpenidze, Onise, Alexandrina Maria Pauceanu, and Shouvik Sanyal. 2019. "Key Success Factors for Business Incubators in Europe: An Empirical Study," *Academy of Entrepreneurship Journal* 25, 25 (1): 1–13.

Antonovica, Arta, Javier de Esteban Curiel, and Beatriz Rodríguez Herráez. 2023. "Factors That Determine the Degree of Fulfilment of Expectations for Entrepreneurs from the Business Incubator Programmes," *International entrepreneurship and management journal* 19, 19 (1): 261–91. https://doi.org/10.1007/s11365-022-00818-1.

18

Antunes, Luiz Guilherme Rodrigues, Gustavo Sifuentes Araújo, and Kassia Cristina Almeida. 2020. "Estabelecendo o Modelo de Negócio de Incubadoras: Delineamento Sob a Ótica Da Literatura Nacional e Internacional," *Revista de Administração, Sociedade e Inovação* 6, 6 (1): 5–23. https://doi.org/10.20401/rasi.6.1.318

Arribas, Emilio Huerta, A Novales, and F Vicente. 2021. "Condiciones Que Favorecen El Emprendimiento: Análisis Económico y Propuestas," *Cuadernos de Información económica* 282, 282: 1–11.

Ayyash, S. A., M. McAdam, and C. O'Gorman. 2022. "Towards a New Perspective on the Heterogeneity of Business Incubator-Incubation Definitions," *IEEE Transactions on Engineering Management* 69, 69 (4): 1738–52. https://doi.org/10.1109/TEM.2020.2984169.

Ballering, Tom, and Enno Masurel. 2020. "Business Incubators and Their Engagement in Sustainable Development Activities: Empirical Evidence from Europe.," *International Review of Entrepreneurship* 18, 18 (2).

Barrios Zarta, Jairo, Gómez, Nelson. Creación Centro De Desarrollo Empresarial – Cedem – Del InstiTuto Tolimense De Formación Técnica Profesional, ITFIP, ESPINAL – TOLIMA. Colombia: Instituto Tolimense de Formación Técnica Profesional. 2021

Bastanchury, Teresa, Carmen De Pablos-Heredero, Anton Garcia, and Santiago Romo-Romero. 2019. "Revisión de La Medición de Capacidades Dinámicas: Una Propuesta de Indicadores Para El Sector Ovino," *Ciencia y Tecnología Agropecuaria* 20, 20. https://doi.org/10.21930/rcta.vol20_num2_art:1463.

Becerra Ardila, Luis, Piedad Arenas Díaz, and Laura Aguilera Monroy. 2023. "Experiencias Significativas de Sistemas Regionales de Innovación En Incubadoras de La Red Cyted Iberincu". https://doi.org/10.4995/INN2022.2022.15693

Benavides-Sánchez, Edward Andrés, Camilo Andrés Castro-Ruíz, and Miguel Ángel Brand Narváez. 2023. "El Emprendimiento de Base Tecnológica y Su Punto de Encuentro Con La Convergencia Tecnocientífica: Una Revisión a Partir Del Algoritmo Tree of Science," *Revista CEA* 9, 9 (19): e2153. https://doi.org/10.22430/24223182.2153

Blanco Jiménez, Francisco José, AnaAsensio Ciria, Débora de Esteban Escobar, Maria Teresa Fernández Fernández, Juan Luis Santos Bartolomé, Celia Polo Garcia- Ochoa, and Juan Carlos Aguirre Quezada. 2023. "Los Servicios Que Prestan Los Viveros Y Aceleradoras De Empresas En España. Ranking 2022/2023." *Funcas.* Avalaible from:

Breivik-Meyer, Marit, Marianne Arntzen-Nordqvist, and Gry Agnete Alsos. 2020. "The Role of Incubator Support in New Firms Accumulation of Resources and Capabilities," *Innovation* 22, 22 (3): 228–49. https://doi.org/10.1080/14479338.2019.1684204.

Cabrera Soto, Marian, and Lourdes Souto Anido. 2023. "El Papel de Las Incubadoras Como Catalizadoras de Emprendimientos de Alto Valor Agregado En Los Ecosistemas de Innovación," *Economía y Desarrollo* 167, 167.

Camayo Llallico, Wendy, Claudia Melissa Vásquez Calderón, and Luis Enrique Zavaleta Núñez. 2017. "Análisis Del Ecosistema Emprendedor Latinoamericano y Su Impacto En El Desarrollo de Startups." Universidad Peruana de Ciencias Aplicadas (UPC) 2017.Available from:

Capatina, Alexandru, Dragos Sebastian Cristea, Adrian Micu, Angela Eliza Micu, Giuseppe Empoli, and Federica Codignola. 2023. "Exploring Causal Recipes of Startup Acceptance into Business Incubators: A Cross-Country Study," International Journal of Entrepreneurial Behavior & Research 29, 29 (7): 1584–1612. https://doi.org/10.1108/IJEBR-06-2022-0527.

Centro de Información y Red de Creación de Empresas (CIRCE). Available from: [cited 2024 Jul 10].

Chaves-Maza, Manuel, and Eugenio M Fedriani. 2022. "Defining Entrepreneurial Success to Improve Guidance Services: A Study with a Comprehensive Database from Andalusia," Journal of Innovation and Entrepreneurship 11, 11 (1): 1–26. https://doi.org/10.1186/s13731-022-00213-8

De Esteban Escobar, Débora, Carmen De-Pablos-Heredero, José Luis Montes-Botella, Francisco José Blanco Jiménez, and Antón García. 2022. "Business Incubators and Survival of Startups in Times of COVID-19" Sustainability 14, no. 4: 2139. https://doi.org/10.3390/su14042139

De la Hoz-Villar, Rita, and Javier Prieto-Flórez. 2020. "Emprendimiento, Dinámica Empresarial y Empleo: Una Revisión Desde La Óptica Del Crecimiento Económico," Revista científica anfibios 3, 3 (1): 11–18.

Deyanova, Kameliya, Nataliia Brehmer, Artur Lapidus, Victor Tiberius, and Steve Walsh. 2022. "Hatching Start-Ups for Sustainable Growth: A Bibliometric Review on Business Incubators," Review of Managerial Science 16, 16 (7): 2083–2109. https://doi.org/10.1007/s11846-022-00525-9.

Diawati, P.; Sugesti, H. Diawati, Pretty, and Hesti Sugesti. 2023. "The Role of Business Incubators in Encouraging Students to Develop Entrepreneurial Ideas," Indo-MathEdu Intellectuals Journal 4, 4 (2): 318–31. https://doi.org/10.54373/imeij.v4i2.202

Díaz Macías, Glenes, and Tatiana Carolina Mora Macías. 2019. "Modelo Para El Acompañamiento En La Incubación de Emprendimientos a Estudiantes de Pregrado de La Facultad de Ciencias Económicas, Administrativas y Contables de La UNAB." Available from:

19

Díaz, Susana Reyes, Lourdes Souto Anido, and Jesica Rodríguez Martínez. 2019. "El Proceso de Selección de Proyectos En Las Incubadoras de Empresas. Propuesta de Procedimiento Para Una Incubadora Universitaria Cubana," GECONTEC: Revista Internacional De Gestión Del Conocimiento Y La Tecnología 7, 7 (2): 20–42. https://doi.org/10.5281/zenodo.7517702

Esteban Escobar, Débora de. 2020. "Relational Coordination in the Entrepreneurial Ecosystem," Available at SSRN 3560142, . http://dx.doi.org/10.2139/ssrn.3560142

Ferreiro Seoane, Francisco Jesús, Jessica Mendoza Moheno, and Martín Aubert Hernández Calzada. 2018. "Contribución de Los Viveros de Empresas Españolas En El Mercado de Trabajo," Contaduría y administración 63, 63 (1): 0. http://dx.doi.org/10.22201/fca.24488410e.2018.926

Flores-Bueno, Daniel, and Oscar Jerez. 2023. "Business Incubators, Performance and Effectiveness: A Systematic Review," Estudios Gerenciales 39, 39 (166): 93–109. https://doi.org/10.18046/j.estger.2022.165.5312.

Gail, David Velasco, and Rosa Mecha López. 2021. "Los Servicios de Apoyo a Las Empresas Basadas En El Conocimiento Universitario: El Caso de La Comunidad de Madrid y Las Spin off de Las Universidades Públicas de Su Ecosistema Innovador." In , 245–52. Universidad Complutense de Madrid.

Gaytán Cortés, Juan. 2020. El plan de negocios y la rentabilidad. Mercados y negocios 2020, 21(42), 143-156, https://doi.org/10.32870/myn.v1i42

Gelasakis, Athanasios I, G E Valergakis, G Arsenos, and G Banos. 2012. "Description and Typology of Intensive Chios Dairy Sheep Farms in Greece," Journal of dairy science 95, 95 (6): 3070–79. https://doi.org/10.3168/jds.2011-4975

Gómez, Liyis. 2002. "Evaluación Del Impacto de Las Incubadoras de Empresas: Estudios Realizados," Pensamiento & Gestión 13, 13: 1–22. Available from:

Habiburrahman, Andjar Prasetyo, Tri Wedha Raharjo, Herrukmi Septa Rinawati, Trisnani, Bambang Riawan Eko, Wahyudiyono, et al. 2022. "Determination of Critical Factors for Success in Business Incubators and Startups in East Java," Sustainability 14, 14 (21): 14243. https://doi.org/10.3390/su142114243.

Haider, A. 2023. Business Incubators and Their Role in Promoting Economic Development in Iraq. Alanya International Congress of Social Sciences 2023, http://dx.doi.org/10.47832/AlanyaCongress2

Handoyo, Setiowiji, Uus Faizal Firdaussy, and Siti Kholiyah. 2021. "Technology Business Incubator Service Challenges During the Covid-19 Pandemic: Traditional Incubator Versus Virtual Incubator," Wacana Journal of Social and Humanity Studies 24, 24 (2).

Hausberg, J. Piet, and Sabrina Korreck. 2020. "Business Incubators and Accelerators: A Co-Citation Analysis-Based, Systematic Literature Review," Journal of Technology Transfer 45, 45 (1): 151–76. https://doi.org/10.1007/s10961-018-9651-y.

Kapasi, I, and L Galloway. 2019. "Home-Based Business: An Exploration of Business Model Heterogeneity," Journal of Business Models 6, 6 (3): 63–78. https://doi.org/10.5278/ojs.jbm.v6i3.2392

Kasanagottu, Suresh, and Sudipto Bhattacharya. 2018. "An Empirical Analysis of Significant Factors Influencing Entrepreneurial Behavior in the Information Technology Industry," International Journal of Engineering & Technology 7, 7 (4.10): 212–16. Available from:

Kehinde Feranmi Awonuga, Noluthando Zamanjomane Mhlongo, Funmilola Olatundun Olatoye, Chidera Victoria Ibeh , , Oluwafunmi Adijat Elufioye and Onyeka Franca Asuzu. 2024. "Business Incubators and Their Impact on Startup Success: A Review in the USA," International Journal of Science and Research Archive, 2024, 11(01), 1418–1432., . https://doi.org/https://doi.org/10.30574/ijsra.2024.11.1.0234

Kinya, Miriti Jane, Kenneth Lawrance Wanjau, and Nyagweth Ebenezer Odeyo. 2021. "The Role of Incubator Classification on Performance of Incubators in Kenya." International Journal of Research in Business and Social Science (2147-4478) 10, 10 (6): 256–67. https://doi.org/10.20525/ijrbs.v10i6.1299

Kiran, Ravi, and Suranjana C Bose. 2020. "Stimulating Business Incubation Performance: Role of Networking, University Linkage and Facilities," Technology Analysis & Strategic Management 32, 32 (12): 1407–21. https://doi.org/10.1080/09537325.2020.1772967.

Kitagawa, Fumi, and Susan Robertson. 2012. "High-Tech Entrepreneurial Firms in a University-Based Business Incubator: Spaces of Knowledge, Resource Heterogeneity and Capital Formation," The International Journal of Entrepreneurship and Innovation 13, 13 (4): 249–59. https://doi.org/10.5367/ijei.2012.009

Klingbeil, Caren, and Thorsten Semrau. 2017. "For Whom Size Matters – the Interplay between Incubator Size, Tenant Characteristics and Tenant Growth," Industry and Innovation 24, 24 (7): 735–52. https://doi.org/10.1080/13662716.2017.1319802.

Landeros García, Carlos, María Mayela Terán Cázares, and Mónica Blanco Jiménez. 2021. "Business Success Factors within Business Incubators, Validation of the Research Tool (Factores de Éxito Empresarial Dentro de Las Incubadoras de Empresas, Validación de La Herramienta de Investigación)," Innovaciones de negocios 18, 18 (35): 71–82. https://doi.org/10.29105/rinn18.35-4

Leal, Marisa, Carmem Leal, and Rui Silva. 2023. "The Involvement of Universities, Incubators, Municipalities, and Business Associations in Fostering Entrepreneurial Ecosystems and Promoting Local Growth," Administrative Sciences 13, 13 (12): 245. https://doi.org/10.3390/admsci13120245.https://doi.org/10.3390/admsci13120245

Lian, Cristina Lin. 2020. "Viveros de Empresa: Mecanismos Dinamizadores de La Capacidad de Innovación Empresarial. Análisis de Los Viveros de Empresas de La Comunidad de Madrid," *ESIC Market* 51, 51 (165): 105–34. https://doi.org/10.7200/esicm.165.0511.2

Lúa, Elsa Edith Zalapa, Yolanda Elena García Martínez, and Martha María Medellín Fontes. 2020. "Incubadoras de Empresas En Las Universidades Como Modelo de Innovación Desde La Triple Hélice," *Revista Electrónica sobre Educación Media y Superior* 7, 7 (14): 19–42.

Lukes, Martin, Cristina Longo, and Jan Zouhar. 2019. "Do Business Incubators Really Enhance Entrepreneurial Growth? Evidence from a Large Sample of Innovative Italian Start-Ups," *Technovation*, 25–34. https://doi.org/10.1016/j.technovation.2018.07.008.

Manconi, Michele, Salvatore Bellomo, Anna Nosella, and Lara Agostini. 2022. "Attributes of Business Incubators: A Conjoint Analysis of Venture Capitalist's Decision Making," *Journal of Risk and Financial Management* 15, 15 (5): 213. https://doi.org/10.3390/jrfm15050213.

Martínez-Martínez, Sofía Louise. 2022. "Entrepreneurship as a Multidisciplinary Phenomenon: Culture and Individual Perceptions in Business Creation," *Academia Revista Latinoamericana de Administración* 35, 35 (4): 537–65.

Mas-Verdú, Francisco, Domingo Ribeiro-Soriano, and Norat Roig-Tierno. 2015. "Firm Survival: The Role of Incubators and Business Characteristics," *Journal of Business Research* 68, 68 (4): 793–96. https://doi.org/10.1016/j.jbusres.2014.11.030.

Mecha-López, Rosa, and David Velasco-Gail. 2023. "El Ecosistema Innovador de Las Spin-Offs Universitarias: Espacios, Agentes y Redes de Transferencia En Los Casos de Estudio Regionales de Madrid y Andalucía," *Revista de Estudios Andaluces*, no. 45: 146–66. https://doi.org/10.12795/rea.2023.i45.08

Momin, Uzma, Sandeep Tare Mehak, and M Dhiliphan Kumar. 2023. "Strategic Planning and Risk Management in the Stratup, Innovation and Entrepreneurship: Best Practices and Challenges," *Journal of Informatics Education and Research* 3, 3 (2). https://doi.org/10.52783/jier.v3i2.290

Morales, Olga González, Rocio Peña Vázquez, and Angélica B Contreras Cueva. 2019. "Las Políticas de Emprendimiento En Europa: Un Estudio Comparado Por Países," *International Review of Economic Policy-Revista Internacional de Política Econó*mica 1, 1 (1): 72–85. https://doi.org/10.7203/IREP.1.1.16458

Nair, Sujith, and Tomas Blomquist. 2019. "Failure Prevention and Management in Business Incubation: Practices towards a Scalable Business Model," *Technology Analysis & Strategic Management* 31, 31 (3): 266–78. https://doi.org/10.1080/09537325.2018.1495325.

Niammuad, Damrongrit, Kulkanya Napompech, and Suneeporn Suwanmaneepong. 2013. "Entrepreneurial Product Innovation: A Second-Order Factor Analysis". *Journal of Applied Business Research* (JABR) 30 (1):197-210. https://doi.org/10.19030/jabr.v30i1.8294.

Nicholls-Nixon, Charlene L., and Dave Valliere. 2020. "A Framework for Exploring Heterogeneity in University Business Incubators" *Entrepreneurship Research Journal* 10, 10 (3): 20180190. https://doi.org/10.1515/erj-2018-0190.

Oh, Won-Yong, Young Kyun Chang, and Rami Jung. 2018. "Experience-Based Human Capital or Fixed Paradigm Problem? CEO Tenure, Contextual Influences, and Corporate Social (Ir)Responsibility," *Journal of Business Research* 90, 90: 325–33. https://doi.org/10.1016/j.jbusres.2018.05.034.

Olmedo, Walter Navas, María Leonor Parrales Poveda, Jimena Herrera, and Brenda Josselyn Calderon Acosta. 2023. "Triple Hélice Un Modelo de Innovación Abierta Para La Sostenibilidad de Latacunga, Cotopaxi-Ecuador.," *Tesla Revista Científica* 3, 3 (2): e184. https://doi.org/10.55204/trc.v3i2.e184

Owda, Maram O., Rasha O. Owda, Mohammed N. Abed, Samia A. M. Abdalmenem, Samy S. Abu-Naser, and Mazen J. Al Shobaki. 2019. "Personal Variables and Their Impact on Promoting Job Creation in Gaza Strip Through Business Incubators," *International Journal of Academic Accounting, Finance and Management Research (IJAAFMR)* 3, 3 (8): 65–77. [https://philarchive.org/rec/OWDPVACrossref]

Paniagua-Rojano, Francisco Javier. 2022. "Comunicación y Startups. Análisis de La Situación Actual de Las Incubadoras de Empresas Emergentes y Su Actividad Comunicativa." In *Asociación Española de Investigación de La Comunicacion*. .

Paoloni, Paola, and Giuseppe Modaffari. 2022. "Business Incubators vs Start-Ups: A Sustainable Way of Sharing Knowledge," *Journal of Knowledge Management* 26, 26 (5): 1235–61. https://doi.org/10.1108/jkm-12-2020-0923 ·

Paredes, Nelly, Sintia Peñaloza, and Pilar Rivera. 2020. "Las Incubadoras y Semilleros de Empresas: Un Análisis de La Realidad En La Zona 3," 593 *Digital Publisher CEIT* 5, 5 (3): 75–92. https://doi.org/10.33386/593dp.2020.3.219

Pattanasak, Photchanaphisut, Tanyanuparb Anantana, Boontarika Paphawasit, and Ratapol Wudhikarn. 2022. "Critical Factors and Performance Measurement of Business Incubators: A Systematic Literature Review," *Sustainability* 14, 14 (8). https://doi.org/10.3390/su14084610.

Paz, Irina Margarita Jurado. 2022. "Emprendimiento Rural Como Estrategia de Desarrollo Territorial: Una Revisión Documental," *ECONÓMICAS CUC* 43, 43 (1): 257–280. https://doi.org/10.17981/econcuc.43.1.2022.Org.7

Peña Ramírez, Camilo, Alan Moreno, Luis Amestica, and Sheila Silva. 2019. "Incubadoras En Red: Capital Relacional de Incubadoras de Negocios y La Relación Con Su Éxito," *Revista de Administração, Sociedade e Inovação* 5, 5: 162–79. https://doi.org/10.20401/rasi.5.2.316.

Pico, María Yarixa Macías, Lorenzo Reyes Montalvo, and Graciela María Castellano Pallerols. 2023. "El Plan de Negocios y Su Papel En La Gestión Empresarial," *Maestro y Sociedad*, 150–159.

Ramar, N, and M Magheswari. 2023. "Business Incubators: The Genesis, Growth, and Innovation Exhilarating," Shanlax International Journal of Management 11, 11 (2): 70–73. https://doi.org/10.34293/management.v11i2.6703

Ramírez González, José Pablo. 2017. Análisis de la Eficiencia de los Viveros de Empresas de la Comunidad de Madrid. Burjc Digital Urjc.es [Internet].

Ramírez, Pablo Lenin Vargas, María Gabriela Zúñiga González, and María Fernanda Mullo Tene. 2020. "Emprendimiento y Su Relación Con El Desarrollo Económico y Local En El Ecuador," *Polo del Conocimiento: Revista científico-profesional* 5, 5 (10): 242–58.

Redondo, María, and Carmen Camarero. 2017. "Relationships between Entrepreneurs in Business Incubators. An Exploratory Case Study," *Journal of Business-to-Business Marketing* 24, 24: 1–18. https://doi.org/10.1080/1051712X.2016.1275826.

Reit, Tatevik. 2022. "Knowledge Transfer in Virtual Business Incubators," *Problemy Zarzadzania-Management Issues* 20, 20 (1): 173–90. https://doi.org/10.7172/1644-9584.95.8.

Ressin, Marat. 2022. "Start-Ups as Drivers of Economic Growth," *Research in Economics* 76, 76 (4): 345–54. https://doi.org/10.1016/j.rie.2022.08.003.

Rijnsoever, Frank J. van. 2020. "Meeting, Mating, and Intermediating: How Incubators Can Overcome Weak Network Problems in Entrepreneurial Ecosystems," *Research Policy* 49, 49 (1): 103884. https://doi.org/10.1016/j.respol.2019.103884.

Romero, Manuel, Rosario LEON, and Graciela CASTELLANOS. 2020. "Modelo de Gestión de Incubadora de Empresa Para La Transferencia de Resultados de I D i En Universidades Ecuatorianas," *Revista ESPACIOS*. ISSN 798, 798: 1015. https://doi.org/10.48082/espacios-a22v43n02

Rudawska, Joanna. 2020. "The Incubation Programme As An Instrument For Supporting Business Ideas At University. An Example From Poland: Example From Poland". *Zeszyty Naukowe UPH Seria Administracja* I Zarządzanie 52 (125). https://doi.org/10.34739/zn.2020.52.01.

Rukmana, Arief Yanto, Ridma Meltareza, Budi Harto, Oom Komalasari, and Nining Harnani. 2023. "Optimizing the Role of Business Incubators in Higher Education: A Review of Supporting Factors and Barriers," *West Science Business and Management* 1, 1 (03): 169–75. https://doi.org/10.58812/wsbm.v1i03.96

Salas Laime, Wilfredo. 2021. "Perfil Emprendedor y Su Relación Con La Incubación Empresarial En Los Estudiantes de La Escuela Profesional de Administración, Universidad Nacional Micaela Bastidas de Apurímac Sede Abancay, 2018."

Sentana, Eloy, Reyes Gonzalez, Jose Gasco, and Juan Llopis. 2018. "New Strategies to Measure and Strengthen the Social Role of Business Incubators: Their Application to a Spanish Region," *European Journal of International Management* 12, 12 (5–6): 536–53. https://doi.org/10.1504/EJIM.2018.094452

Shehada, Rania Y, A El Talla, Mazen J Al Shobaki, and Samy S Abu-Naser. 2020. "The Reality of Using the Balanced Scorecard in Business Incubators," *International Journal of Engineering and Information Systems (IJEAIS)* 4, 4 (3): 67–95.

Shekapure, Nitin, Dipti D Patil, and Swati Shekapure. 2024. "Data Analytics for Finding Emerging Entrepreneur's Success Factors," Journal of Autonomous Intelligence 7, 7 (2). http://dx.doi.org/10.32629/jai.v7i2.956

Shi, Congming, Bingtao Wei, Shoulin Wei, Wen Wang, Hai Liu, and Jialei Liu. 2021. "A Quantitative Discriminant Method of Elbow Point for the Optimal Number of Clusters in Clustering Algorithm," *EURASIP Journal on Wireless Communications and Networking* 2021, 2021 (1): 31. https://doi.org/10.1186/s13638-021-01910-w.

Syakur, M A., B K. Khotimah, E M S. Rochman, and B D. Satoto. 2018. "Integration K-Means Clustering Method and Elbow Method for Identification of The Best Customer Profile Cluster," IOP Conference Series: Materials Science and Engineering 336, 336 (1): 012017. https://doi.org/10.1088/1757-899X/336/1/012017.

Tang, Mingfeng, Grace Sheila Walsh, Cuiwen Li, and Angathevar Baskaran. 2021. "Exploring Technology Business Incubators and Their Business Incubation Models: Case Studies from China," *The Journal of Technology Transfer* 46, 46 (1): 90–116. https://doi.org/10.1007/s10961-019-09759-4.

The World Bank. Small and Medium Enterprises (SMEs) Finance. Available from: (accesed on 9 de agosto 2024)

Toril, Juan Uribe, and Jaime de Pablo Valenciano. 2009. "Aproximación Al Modelo Europeo de Viveros de Empresas. Estudio de Casos," *Boletín económico de ICE*, no. 2973.

United Nations. 2024. Micro-, Small and Medium-sized Enterprises Day, 27 June. MSMEs and the SDGs. Available from:

Vaz, Roberto, João Vidal de Carvalho, and Sandrina Francisca Teixeira. 2022. "Towards a Unified Virtual Business Incubator Model: A Systematic Literature Review and Bibliometric Analysis," *Sustainability* 14, 14 (20): 13205. https://doi.org/10.3390/su142013205

Velasco Uribe, Jullie Xiomara. 2020. "Estructuración de Una Guía de Acompañamiento Para La Línea Estratégica de Incubación Del Centro de Desarrollo Empresarial de La Universidad Pontificia Bolivariana Seccional Bucaramanga."

Weele, Marijn A. van, Frank J. van Rijnsoever, Menno Groen, and Ellen H. M. Moors. 2020. "Gimme Shelter? Heterogeneous Preferences for Tangible and Intangible Resources When Choosing an Incubator," *Journal of Technology Transfer* 45, 45 (4): 984–1015. https://doi.org/10.1007/s10961-019-09724-1.

Wu, Wenqing, Hongxin Wang, and Yenchun Jim Wu. 2021. "Internal and External Networks, and Incubatees' Performance in Dynamic Environments: Entrepreneurial Learning's Mediating Effect," *The Journal of Technology Transfer* 46, 46 (6): 1707–33. https://doi.org/10.1007/s10961-020-09790-w.

Xu, Zeshui, Xindi Wang, Xinxin Wang, and Marinko Skare. 2021. "A Comprehensive Bibliometric Analysis of Entrepreneurship and Crisis Literature Published from 1984 to 2020," *Journal of business research*, 135, 135: 304–18. https://doi.org/10.1016/j.jbusres.2021.06.051

Yusubova, Ayna, Petra Andries, and Bart Clarysse. 2019. "The Role of Incubators in Overcoming Technology Ventures' Resource Gaps at Different Development Stages," *R & D Management* 49, 49 (5): 803–18. https://doi.org/10.1111/radm.12378

Zapata-Guerrero, Francisco Tomás, Jannett Ayup, Elizabeth L Mayer-Granados, and Jorge Charles-Coll. 2021. "Incubator Efficiency vs Survival of Start-Ups," *RAUSP Management Journal* 55, 55: 511–30. https://doi.org/10.1108/RAUSP-04-2019-0063

Zapata-Molina, Cesar, Juan Manuel Montes-Hincapié, José Londoño-Arias, and Hugo Baier-Fuentes. 2022. "El Valle de La Muerte de Los Emprendimientos: Una Revisión Sistemática de Literatura," *Dirección y Organización*, no. 78: 18–30. https://doi.org/10.37610/dyo.v0i78.628

Zuluaga, María Eugenia Gómez, and Juan Carlos Botero Morales. 2016. "Startup y Spinoff: Una Comparación Desde Las Etapas Para La Creación de Proyectos Empresariales," *Revista ciencias estratégicas* 24, 24 (36): 365–78. https://doi.org/10.18566/rces.v24n36.a7