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Full cities, empty territories

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Extended abstract

EXTENDED ABSTRACT

Title: Location determinants of start-ups in emergent industries in Barcelona

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Abstract:

In recent years, scholars have highlighted the role of cities as start-up incubators. Among these cities, Barcelona is highly ranked internationally, just behind other European cities such as London, Paris, Berlin, and Amsterdam. Barcelona is a European paradigm for the creation of technological firms (CITIE 2015; Start-up Genome 2017; Arauzo et al., 2017) and ICT innovations (De Prato et al. 2015). Barcelona's increasing popularity as start-up hub is at least partially due to efforts made by the Catalan government over the last years to develop a rich and diverse ecosystem.

This paper contributes to the literature on the geography of entrepreneurship by examining how the local attributes and proximity to the elements of an entrepreneurial ecosystem (EE) and to nearby economic activity influences the location of ambitious start-ups in the city of Barcelona. We focus on a certain group of start-ups: scalable,



ambitious, innovative-based start-ups in emergent industries. More specifically, we make use of micro-geographic data for at firm level provided by the Catalan government (ACCIO) that provides information on the main industries in which start-ups operate. We group start-ups into six broad groups by applying a multivariate statistical method: Creative, Ecological, Experiences, Mobility, Health, and Industry 4.0. The focus on the emergent industries is interesting as new technologies are creating new market opportunities for start-ups and transforming the more traditional sectors. Thus, start-ups operating in different emergent industries present intrinsic characteristics that should be considered in the analysis. This is important in determining the local characteristics that influence the location of certain types of start-ups within the city.

When analysing the location decision of start-ups, we can both adopt the point of view of the entrepreneur or that of the chosen territory (Arauzo et al. 2010; Devereux et al. 2007). In this paper rather than examining location decisions from the viewpoint of the agent that makes the choice, we approach the issue from the viewpoint of the chosen territory (the neighbourhoods of Barcelona). Hence, examining the location of start-ups within the city, it is crucial for policymakers to understand the locational factors of start-ups within the city and develop the necessary measures to deal with this increasing attraction to focal points on the city or redistribute them across all the neighbourhoods of the city. At the same time, this is important for entrepreneurs, and investors too, to identify where it is the best location for carry out their activities at the early stage of their projects.

This paper builds primarily on research on agglomeration economies and entrepreneurial ecosystems. The term entrepreneurial ecosystem (EE) has emerged in recent years to describe a framework for understanding the environment in which entrepreneurs operate and the effects of entrepreneurship on the economy (Acs et al. 2017; Stam and Spigel 2017; Stam and van den Ven 2021; Alvedalen and Boschma 2017). EE consist of a set of interdependent actors, and factors coordinated for enabling productive entrepreneurship, in a geographical area (Stam and Spigel 2017; Stem and van den Ven 2021). Despite considerable research interest in high tech start-ups, most scholars have worked to identify the elements of the EE at the national or regional level



(Harmaakorpi and Rinkinen 2020); however, empirical evidence within the city testing the impact of EE on the location of start-ups is scarce (Andersson and Hellerstedt 2009; Audretsch et al. 2010; Bosma and Sternberg 2014) and mostly focused on the US case (Lee et al. 2004; Florida and Mellander 2016). Thus, analysis on the contribution of EE adapted to the context of each city are necessary (Stem and van den Ven 2021; Fritsch and Wrwich 2020a,b; Lange and Schmidt 2020).

Much of the contributions on agglomeration economies and entrepreneurship address the location determinants of start-ups at national or regional level, and considers cities as homogeneous areas, this work focuses on the influence of neighbourhood features within a city. The access to micro-geographic data and the geolocalization of start-ups allows us to account for the heterogeneous distribution of amenities and elements of the entrepreneurial ecosystem across neighbourhoods within the city. In this sense, if start-ups are mainly attracted to well-located neighbourhoods where ‘things happen’ (i.e., buzz, social and networking events), start-ups may be willing to co-locate in some locations of the city and then a rapid decay of agglomeration economies once one moves away from these focal points is expected. Indeed, Barcelona by sure does not present a homogenous spatial distribution in terms of innovative and creative activities as recent contributions have shown (Arauzo-Carod et al., 2017; Coll-Martinez et al., 2019; Coll-Martinez, 2019).

This paper employs geographically refined data from the Catalan government (ACCIO), and open data on Barcelona neighbourhoods’ socioeconomic composition provided by the Statistics Department of the Council of Barcelona together with geographic information systems (GIS) software to study the spatial pattern of ambitious start-ups in Barcelona in different emergent industries. Concretely, we obtained data on start-ups for Barcelona from the public directory *Barcelona & Catalonia Startups Hub* created at the end of December 2016 by the Catalan agency for business competitiveness (ACCIÓ), and which provides firm-level information including address, year of creation, industry, business model, and target for more than 1,000 start-ups from all Catalonia. The Government of Catalonia has created this directory with a view to promoting start-ups internationally and helping them grow. The companies that are retained in the directory



are start-ups that: 1) are recently established (maximum 10 years); 2) are scalable with high growth potential; 3) are founded by ambitious entrepreneurs, highly committed to growth; 4) are innovative or technological; 5) are globally market focused; 6) have a company VAT No. (i.e., proposals from self-employed people are not accepted); and 7) should NOT merely be a consultancy/agency or developing software/apps only for others. Although the data in the directory is updated periodically based on new applicants and their validation by ACCIÓ, the data we used refers to all start-ups included into the directory in January 2018. At that moment, information for a total of 1,245 Catalan start-ups was identified. It is worth saying that more than 60% of the start-ups retained were established at Barcelona city, the capital city of the region and the city. After a selection process only retaining the companies providing address and zip code information and that were located in the city of Barcelona, we finally obtained a sample of 460 start-ups created between 2012 and 2015. With this information we were able to define our dependent variable, the count of start-ups by neighbourhood created between 2012 and 2015 (*SUPS*). Table 1 provides the classification of start-ups in emergent industries. This classification allows us to test whether start-ups operating in different emerging industries show different location patterns.

Table 1. Classification of Start-ups by emergent industries

Emergent industries	Start-ups 2012-15
Creative	117
Ecological	37
Experiences	33
Mobility & Business services	35
Health	50
Mobile Services	188
Total start-ups entries	460

The key contribution regard to previous studies involve the estimation of the count of incumbent firms and the amount of an EE elements (individually and defined as an EE index) as well as a set of local attributes that describe the neighbourhood’s environment.

Agglomeration measures and proximity to urban attributes are computed by using GIS techniques. For each creative firm and year, a series of firm ring variables are created

counting the number of neighbouring firms or elements of the EE within each distance band defined around the centroids of the neighbourhood of the reference start-up (from 0 to 5 km). With this fine level of geographic detail, we can accurately account for agglomeration economies as they are thought to decay with distance rather than being bounded by political borders (Rosenthal and strange 2005; Arzaghi and Henderson 2008). This is a critical point according to recent contributions that find that the spatial extent of agglomeration economies for creative and knowledge intensive firms ranges between 0 and 1 km (Coll-Martinez et al. 2019, Coll-Martinez 2019 or Arauzo-Carod et al. 2017).

Figure 1. Hotspots for start-ups by emergent industries in Barcelona (2012-2015)



Source: Authors based on ACCIO data.

To give an initial overview of the geographical distribution of the start-ups in each of the 6 emergent industries that located in Barcelona between 2012 and 2015, Figure 1 shows a heatmap where the start-up density is indicated by the red hotspots. Clearly, almost all of start-ups are clustered around the most central neighbourhoods overlapping Barcelona's main axis, Diagonal Avenue, a pattern that stays static between 2012 and 2015. The two main hotspots found are in the central segments of Diagonal Avenue (A) and in 22@ district (B), areas that stand out for their concentration of facilities, public



services (i.e., administrative, and financial support), and agents defining the innovative start-up ecosystem.

Our results suggest that there is an extensive variation within the city of Barcelona in the types of start-ups and elements of the EE. First, our analysis of the sources of entrepreneurship suggests that the number of local activities in start-up's own industry (localisation economies) are shown to affect the location of start-ups. For some industries, it is non-significant which confirms that the six emerging industries considered in the analysis differ in their locational specificities. Third, these localisation economies are shown to attenuate with distance. Typically, the effect of the environment beyond one kilometre are an order of magnitude smaller than the effects of the more immediate environment. Moreover, ambitious start-up's location is considerably associated with proximity to the primary elements of a start-up eco-system (i.e., coders, access to financing, talent, coworking spaces). Their influence is always positive even when controlling for reverse causality. All these results confirm the importance of spatial proximity in terms of networking or information spillovers effects during the initial stages of firms, which are supposed to be the most active in terms of innovation, such is the case of ambitious start-ups as previous works suggested (see, for instance, Torre (2008) or Markusen (1985)) and that these results depend on the type of emergent industry in which the start-up operates.

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