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Rural entrepreneurial ecosystems: How are they different? Research on the determinants of rural entrepreneurship in Colombia and Ecuador

DOCTORAL DISSERTATION
(Summary)

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Abstract

Literature recognises that entrepreneurship is a complex, multidimensional phenomenon whose success depends on a set of interrelated factors and actors in a place: an ecosystem. To date, several conceptual frameworks and measurement tools for entrepreneurial ecosystems (EE) have been developed. However, what remains questionable is whether every ecosystem, for example rural ecosystems, operate in the same way as ecosystems in urban regions. The present dissertation was designed to investigate whether rural EE are different from their urban counterparts and if so, in which ways. Three different research methods were employed to meet this aim: a systematic literature review, a regionalized adaptation of the Global Entrepreneurship Index (GEI) methodology and fuzzy-set Qualitative Comparative Analysis (fs/QCA). The systematic review of rural entrepreneurship and rural entrepreneurial ecosystems literature reveals that present well-known theoretical framework models of EE can only partially define and measure EEs in rural contexts as they do not consider place-sensitive factors such as: rural poverty, territorial capital: natural and human resources endowments in rural locations, and peripheral location. Results from the application of the regionalised GEI methodology provided initial evidence of differences between urban and rural ecosystems in terms of performance. On the one hand, rural ecosystems perform overall lower than their urban counterparts. On the other hand, ecosystem bottlenecks (weakest system's component) composition and severity is apparently different between urban and rural areas. Finally, fs/QCA study revealed substantial differences in the weights (levels of necessity) of each of the EE elements and on the ecosystems' configurations that result in high-level entrepreneurship in rural regions and in urban regions. The findings of these studies encourage researchers with an interest in measuring EE quality in rural regions to consider both, the role of rural specificities in entrepreneurship and the existence of different weights of rural EEs elements (as an alternative of assuming that all EEs elements are equally important) in their empirical investigations to provide more context sensitive research insights and policy recommendations.

Keywords: entrepreneurial ecosystems, rural entrepreneurship, fs/QCA, GEI, rurality

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1. Introduction

1.1. Research background

Entrepreneurship has been widely recognised as an important driver of economic growth. A large body of literature confirms a positive role of entrepreneurship in the economic performance of countries, regions, and cities (Ács et al., 2008; Audretsch et al., 2015; Glaeser et al., 2010; Naudé, 2013). Therefore, understanding entrepreneurship, from diverse perspectives, has become a major area of research interest in economics, management, and regional sciences (Audretsch, 2012b; Müller, 2016). Central to the entire field of entrepreneurship research is the concept of entrepreneurial ecosystems (EE) and their role in enabling entrepreneurship (Malecki, 2018; Qian, Acs, & Stough, 2013; Stam & van de Ven, 2021). Essentially, the term entrepreneurial ecosystem refers in its broadest sense to ″A dynamic, institutionally embedded *interaction* between entrepreneurial attitudes, abilities, and aspirations, by individuals which drives the allocation of resources through the creation and operation of new ventures″ (Ács et al., 2014, p. 479). Efficient entrepreneurial ecosystems are said to produce entrepreneurship as an output (Stam & van de Ven, 2021). In the literature there are multiple definitions of entrepreneurship, on the one hand entrepreneurship refers to quantity (Kirznerian) entrepreneurship, on the other hand, it also implies quality (Schumpeterian) entrepreneurship. Quality entrepreneurship encompasses high-growth oriented, innovative business run by creative entrepreneurs, while quantity-based entrepreneurship refers to business formation and density (Szerb, Lafuente, Horváth, & Páger, 2019). To date, the EE concept has been remarkably beneficial for scholars and policymakers as it has contributed to gaining a comprehensive understanding of how entrepreneurship is produced and can be sustained in a place, and the concept of EE has attracted much attention from both policy and research, which can be seen in the rapid increase of publications over the last ten years (Cavallo, Ghezzi, & Balocco, 2019; Malecki, 2018). After decades of research, the entrepreneurial ecosystems (EE) concept has emerged as one of the most comprehensive ways to understand and measure entrepreneurship (Autio, Szerb, Komlosi, & Tiszberger, 2018). The EE concept is popular these days. However, conceptualisation and measurement of EE still have knowledge gaps (Cavallo et al., 2019; Stam, 2015).

1.2. The motivation for the research

A crucial criticism of the literature regarding EE conceptualisation is the primary focus of entrepreneurial ecosystems research on advanced economies and the lack of – proper – attention to the effect of local contextual conditions for a broader entrepreneurship conceptualisation (Aldrich & Ruef, 2018; Audretsch, 2019). It is now well established that entrepreneurial ecosystems are highly localised, meaning that the local milieu is key to the functioning of the ecosystem: ″Entrepreneurship is understood to take place in localities or, at most, regions, drawing on local resources, institutions, and networks″ (Malecki, 2018, p.1, Welter, 2011). However, Welter, Baker, & Wirsching (2019) argues that current entrepreneurship measurement remains largely *decontextualised* mainly due to the use of

"universal" measurement tools of entrepreneurship which have been designed and operationalised from and for successful, usually western contexts.

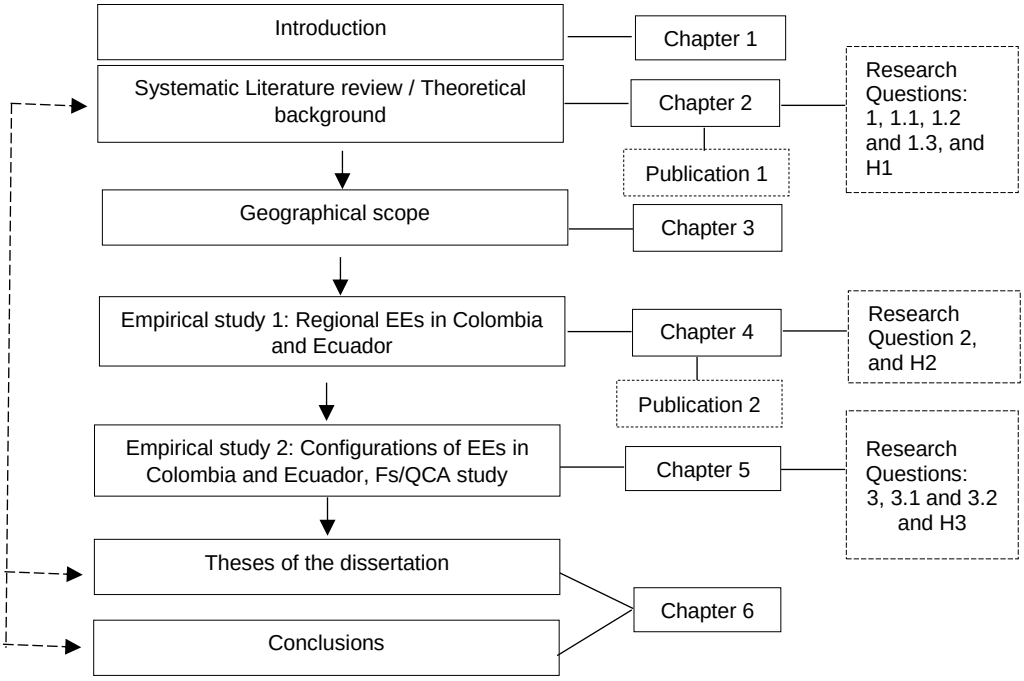
Moreover, much academic debate still exists around the measurement tools for EE. It is now well established that certain EE elements and their interaction predominantly determine the ecosystem's success (Ács et al., 2014; Stam, 2015). However, the discussion of entrepreneurial ecosystems seems to remain focused on identifying the essential "ingredients" of an ecosystem and overlooks the importance of understanding the processes or "recipes" for their combination into a sustainable ecosystem (Malecki, 2018). Scholars highlight the need for an empirical investigation of the *complex* interrelatedness between these elements (Alvedalen & Boschma, 2017). On this subject, researchers suggest that agent-based modelling, network analysis, interpretivist methods or qualitative comparative analysis (QCA) are promising research methods for examining entrepreneurial ecosystem elements' complex interrelatedness (Berger & Kuckertz, 2016; Douglas et al., 2020; Roundy et al., 2018). Considering these knowledge gaps found in the literature, in this dissertation, I attempt to comprehensively explore the differences between urban and rural regional entrepreneurial ecosystems by employing three research methods: a systematic review of literature on rural entrepreneurial ecosystems, an empirical study of the characteristics and status of regional urban and rural EEs in Colombia and Ecuador and an empirical study about the configurations of regional EEs within these two countries. Together the theoretical and empirical results are the foundation to define the key differences between urban and rural ecosystems.

The technical reason for setting this geographical boundary was the availability of individual entrepreneurial data (Adult Population Survey from the Global Entrepreneurship Monitor full raw datasets 2010-2018) Moreover, Ecuador and Colombia were selected as the focus as these two countries share similar socio-economic characteristics (e.g., middle income economies, Andean geography, GDP composition, GDP per capita, poverty and inequality rates), and this makes data merging and results comparisons sounder. Finally, I have a personal interest in contributing to a better understanding of paths for regional development in rural contexts in developing countries. Rural regions have the potential -and the right- to develop sustainably and to do so, provide good living conditions for rural inhabitants. Despite the increasing global urbanisation trend, rural populations are still a big part of many economies, such as Ecuador, my homeland. In 2021, Ecuador held the bigger share of the rural population in South America, with 36% of the total population living in rural settings.

1.3. Structure of the dissertation

This dissertation constitutes a compendium of three main sources of data: systematic literature review, one empirical study employing a regionalized adaptation of the Global Entrepreneurship Index (GEI) methodology, and results from a Fuzzy-set qualitative comparative analysis (fs/QCA) study. When structuring the dissertation, I ensure that the individual chapters are connected to each other in an easy-to-follow logical structure as presented in Figure 1.

Figure 1: Stages of research of the doctoral dissertation



Source: own elaboration

1.4. Aim and research questions and hypotheses

Dissertation's Aim

Examine the differences between urban and rural regional entrepreneurial ecosystems by employing three research methods: a systematic review of literature on rural entrepreneurial ecosystems, an empirical study of the characteristics of regional urban and rural EEs in Colombia and Ecuador and an empirical study about the configurations of regional EEs within these two countries.

Research questions and hypotheses

RQ1. Are rural entrepreneurial ecosystems different?

RQ 1.1: Are rural entrepreneurial ecosystems elements different from those in urban ecosystems?

RQ 1.2: Are there any elements of rurality that should be incorporated in rural EE measurement?

RQ 1.3 Can "universal" EE frameworks (fully) describe rural EE?

H1: Rural EE elements are different from those in non-rural ecosystems since there are further elements of rurality that should be incorporated in rural EE measurement. Consequently, "universal" EE frameworks cannot (fully) describe rural EE.

RQ2: Which EE components hinder rural and urban entrepreneurship?

H2: Rural areas are affected by different bottlenecks (weakest components of the EE) than urban areas.

RQ3: Do EE configurations differ in rural and urban regions regarding high-level entrepreneurship?

RQ 3.1: What EE configuration(s) drive quantity/quality entrepreneurship in *urban regions* in Colombia and Ecuador?

RQ 3.2: What EE configurations drive quantity/quality entrepreneurship in *rural regions* in Colombia and Ecuador?

H3: Different EE configurations drive quantity/quality entrepreneurship in rural and urban regions in Colombia and Ecuador.

2. Literature Review: rural entrepreneurial ecosystems conceptualisation

The first aim of literature review was to find out whether rural entrepreneurial ecosystems are different from urban ecosystems and if so, in which way. Literary data comes mainly from two sources: the results from my first systematic review paper entitled "Rural entrepreneurial ecosystems: A systematic literature review for advancing conceptualisation", performed in 2019 and published in Entrepreneurial Business and Economics Review journal in 2021 (Calispa-Aguilar, 2021) (70 journal articles) and 34 articles collected through an additional literature search in rural entrepreneurship performed in 2021.

2.1. Rural EE literature: Are rural entrepreneurial ecosystems unique?

This section aims to theoretically determine the extent to which the spatial specificities from rurality, can cause EEs to function fundamentally differently from those in urban areas. The motivation of this search is to reveal, based on a comprehensive literature review, whether beyond the elements of the decontextualized EE models presented in the previous section, there are any additional aspects of rurality which affect rural EE. If yes, what are these aspects of rurality and how they influence entrepreneurship?

The first stage of the procedure for examination of literature on rural ecosystems and rural entrepreneurship was to identify whether the themes from literature in rural entrepreneurship are novel to current EE conceptualisation or not. EEs framework models of Ács, Autio, & Szerb (2014), Isenberg (2011) and Stam & van de Ven (2019) has been selected as a representation of the "standard" models because these are the most well-known models within literature in entrepreneurship. As shown in Table 1, based on a critical and detailed full-text reading of each of the papers, the topics (themes) from each paper were classified as "covered" or "uncovered" by these three selected EEs models. In this way, I could distinguish a set of "universal" and the novel rural "context-sensitive" elements. Universal elements are then those factors that are mentioned both as a part of standard EE frameworks and in the rural entrepreneurship literature. Conversely, context-sensitive EE elements are defined as those

factors which are investigated in the rural entrepreneurship literature but are not covered by the selected standard conceptual models of EEs.

On the one hand, literature shows that there are no major differences in the composition of urban and rural entrepreneurial ecosystems. "Universal" factors such as culture, policy, formal institutions, government, opportunity startup, talent, knowledge, networks, leadership, human capital, startup skills, high growth aspirations, startup skill, technology adoption capacity, supports, markets and demand, physical infrastructure and finance are relevant for entrepreneurship both in urban and rural contexts. However, literature also allowed the identification of three "context-sensitive" elements which seem to be distinctive for rural entrepreneurship (i.e., are not covered by standard models of EEs) and that should be incorporated in rural EE measurement: *rural poverty*, *territorial capital*: *natural and human resources endowments* in rural locations, and *peripheral location*. In this regard, because these rurality-related elements are not yet embedded in standard EE frameworks, I assert that these frameworks can only *partially* define EEs in rural contexts.

Furthermore, literature also shows that The National Entrepreneurship Context Index – NECI, a framework measure recently developed by The Global Entrepreneurship Monitor (GEM), the Entrepreneurial Ecosystem Index: EEINDEX developed by Leendertse et al. (2021) and the Global Entrepreneurship Index (GEI) are the most well-known tools for entrepreneurship measurement. In this context, the GEI was regarded as a quasi-context-sensitive method to measure the performance of EEs. One of the foremost features of the GEI conceptual model and index methodology is that it reflects the multidimensional character of entrepreneurship in two ways, first the GEI index is calculated by combining both individual (entrepreneurs, population) and institutional (contextual) data. Second, the GEI ensure the systemic nature of EEs by employing the so-called Penalty for Bottleneck (PFB) methodology in their models.

Table 1: Correspondence of rural literature with constructs of EE elements

Themes from rural literature	(Isenberg, 2011)	(Stam, 2015; Stam & van de Ven, 2019)	(Ács, Autio, & Szerb, 2014)
	Factors/pillars of standard EEs		
Perceptions of the status of entrepreneurship (Basson & Erdiaw-kwasie, 2019).	Culture	Culture	Cultural Support
Risk aversion (Cieslik & Aoust, 2017).			Risk acceptance
Trust in officials and public servants and corruption perception (Amorós & Mandakovic, 2017; Gorbuntsova, Dobson, & Palmer, 2018; Lanjouw, Quizon, & Sparrow, 2001; Traikova, Manolova, Möllers, & Buchenrieder, 2017).	Policy		
The local policy approach and entrepreneurial development (Nguyen, Frederick, & Nguyen, 2014).	Policy	Formal institutions	
Political and administrative framework (Langenbach & Tuppen, 2017; Muñoz, Kibler, Mandakovic, & Amorós, 2020)	Government	Formal institutions	Opportunity startup
Public institutions, policymakers (Musolino, Crea, & Marcianò, 2018).	Government	Formal institutions	Opportunity startup
Agricultural competitiveness (Pindado & Sánchez, 2019).		Talent	
Better developed non-farm economy (Brünjes & Diez, 2012).		Knowledge	
Relationships within rural entrepreneurs (Aarstad et al., 2010; Ring et al., 2010; Roundy, 2019).	Networks	Networks	Networking
Social capital and cooperation (McKeever, Anderson, & Jack, 2014; Meccheri & Pelloni, 2006).	Networks	Networks	Networking
Social relationships (Zhao, Ritchie, & Echtner, 2011).	Networks	Networks	Networking
Ability to collaborate with local and non-local stakeholders (Milone & Ventura, 2018).	Networks	Networks	Networking
Participating in networks (Cieslik & Aoust, 2017; Freire-Gibb & Nielsen, 2014).	Networks	Networks	Networking
Embeddedness in the social structure (Jack & Anderson, 2002; Martynovich, 2017).	Networks	Networks	Networking
'Placial embeddedness' (Korsgaard, Ferguson, & Gaddefors, 2015).	Networks	Networks	Networking
Kin and personal relationships (Alsos, Carter, & Ljunggren, 2013; George, Kotha, Parikh, Alnuaimi, & Bahaj, 2016; Peng, 2004; Venkatesh, Shaw, Sykes, Fosso Wamba, & Macharia, 2017; Yu & Artz, 2018).	Networks	Networks	Networking
Regional levels of urbanisation (Radicic, Bennett, & Newton, 2017)			Networking
Entrepreneurial role models (Lafuente, Vaillant, & Rialp, 2007)	Culture	Leadership	Networking
Leading role models (Bakas, Duxbury, & Vinagre de Castro, 2018; Musolino et al., 2018).	Culture		Networking
The role of visionary entrepreneurs (Brooker & Joppe, 2014).	Culture		Networking
The effect of legitimized 'high profile entrepreneurs' (Anderson, Warren, & Bensemann, 2018).	Culture		Networking
Entrepreneurial examples -role models (Basson & Erdiaw-kwasie, 2019).	Culture		Networking
Educational level (Folmer, Dutta, & Oud, 2010).	Human capital	Talent	Startup skills

Higher education and training (Nguyen et al., 2014)		Talent	Startup skills
Language proficiency (Wei, Jiao, & Growe, 2018).	Human capital	Talent	
Entrepreneurial behaviour, professional background, and networks (Hassink, Hulsink, & Grin, 2016).			
Entrepreneur's characteristics: gender, race, age, main occupation (Barbieri & Mshenga, 2008; Folmer et al., 2010; Huggins, Prokop, & Thompson, 2017; Kalantaridis, 2006; Radicic et al., 2017; Williams & Nadin, 2013).	Human capital		
Innovative behaviour (Pindado & Sánchez, 2019).			High growth
Business competencies (Kasabov, 2016; Phelan & Sharpley, 2011).	Human capital	Talent	
Entrepreneurial skills (Dias, Rodrigues, & Ferreira, 2018).	Human capital	Talent	Startup skills
Access to new technologies: the Internet (Cumming & Johan, 2010).	Supports		Tech. Adoption
Knowledge about the available entrepreneurial support (Malebana, 2017).	Supports		
Market demand consumers' requests (Roundy, 2018; Yachin, 2017).	Markets	Demand	
Web access, telecommunication and e-infrastructure (Krakowiak-bal, Ziemianczyk, Wozniak, & Krakowiak-bal, 2017).	Supports	Physical infrastructure	Tech. Adoption
Venture capital, access to microcredit (Bhuiyan & Ivlevs, 2018; Chakravarty & Shahriar, 2015; Chliova, Brinckmann, & Rosenbusch, 2015; Dutta & Banerjee, 2018; Robert, Frey, & Sisodia, 2021).	Finance	Finance	Finance
System outcome/output measurements			
Productive entrepreneurship			
Creation of new ventures			
Entrepreneurship			
Contextualised factors: Aspects from rural entrepreneurship literature			
• ***Rural EE factors not mentioned in the decontextualised EE literature***			
Rural poverty			
Natural and human resources endowment in rural locations			
Peripheral location			
• **Rural EE factors mentioned by the rural EE literature emphasizing their local community building/strengthening role**			
Rural cultural values: *foundation for local community building*			
Local ties: community building mechanism at the local level			
System outcome/output measurements			
Farm diversification			

Source: own elaboration

3. Regionalized GEI: a quasi-context-sensitive method characterizing EE performance

The aim of this empirical study was to explore the differences between urban and rural regional entrepreneurial ecosystems in terms of EEs performance using the results from a regionalized version of the Global Entrepreneurship Index (GEI) methodology.

3.1. The geographical scope of the study

This study outlines the regional entrepreneurial ecosystems of 22 regions: 11 regions in Colombia, 7 regions in Ecuador, and 4 regions in Uruguay. The unit of analysis in the present study is the "Macro region'. Macro regions are composed of various smaller administrative, subnational-level units, namely, departments or provinces within a country. Macro regions are smaller than a country but bigger than the country administrative units. A total of 10 macro regions in Colombia (5), Ecuador (3), and Uruguay (2) are studied. Six of these ten regions are subdivided into urban and rural subregions in order to analyse them separately and identify possible differences between these two configurations.

3.2. Methodological aspects: The regional adaptation of the GEI

The GEI is a composite indicator that measures both the quality of entrepreneurship and the attributes of the supporting EE in a *country*. The GEI is a complex four-level index that combines 14 pillars, each of which contains an individual and an institutional variable corresponding to the micro- and macro-level aspects of entrepreneurship. Data for individual variables comes from pooled data set of more than 75,000 observations from the Global Entrepreneurship Monitor (GEM) Adult Population Survey 2010–2018. Data for institutional variables comes from secondary data from several national-level and regional-level institutions from each country. For employing the national GEI methodology to analyse regional entrepreneurship systems, data and structures need to be modified to reflect the regional conditions. The optimal scenario would be to have the access to and use regional data on the same variables used at the national level. Nonetheless, acquiring the same original GEI data type is challenging in the context of South America, where no strong regional institutions are responsible for collecting and sharing regional data. In the present study, this issue is solved in two ways, either by measuring unavailable variables with closely correlated proxy data or employing a national level data for all the regions within a country.

The GEI scores are calculated following an eight-stage process, which starts with the selection of variables, construction and normalisation of pillars, capping, average pillar adjustment, penalising, as well as the calculation of sub-index and GEI super index (Ács et al. 2014). Pillar values range from 0 to 1 as these are first normalised. Thereafter, the pillars are allocated into three building blocks or sub-indices, namely, entrepreneurial attitudes (ATT), (ABT), and (ASP). The value of a sub-index is the arithmetic average of its adjusted pillars for that sub-index multiplied by 100. Finally, the average of the three sub-indices constitutes the entrepreneurship super-index (Ács et al., 2018). The index scale ranges between 0 and 100, with 100 as the maximum value and 0 as the potential minimum.

3.3. Results

Analysis at the GEI subindices level allows for observations of specific issues around entrepreneurship development, and simultaneously, it enables more specific regional differences to be identified. In Table 2 the regional scores for ATT rank between 18.90 and 47.19, ASP range between 15.58 and 37.84, while the range for entrepreneurial aspirations is relatively wider – the regional scores range between 8.28 and 43.65. For both ATT and ABT, Montevideo receives the highest values, while for ASP, Andina Urban attains the highest scores. Amazonía (Ecuador) scores the lowest regional values for the three sub-indices. Furthermore, from Table 2, two cluster groups can be identified: first, the leading entrepreneurial regions, that is, those that perform relatively strongly for most of the three sub-indices and the overall GEI score, such as the Colombian regions of Andina, Andina Urban, and Andina Rural, and the Uruguayan region of Montevideo. These regions also show some common characteristics: both Andina and Montevideo are highly urbanised (81% and 98.94%), capital city is within these regions, and they have the highest rates of tertiary education and the lowest levels of poverty of the 22 regions. Second, the lagging entrepreneurial regions can also be identified. The Ecuadorian regions of Amazonía and Costa Rural and Sierra rural have the lowest values in most of the three sub-indices and overall, GEI score.

Moreover, comparing the country subindices averages it can be observed that ATT averages are the highest in the three countries, meaning that overall, the population and institutions in these countries enable an optimistic view and positive attitude towards entrepreneurship. In the case of Uruguay and Ecuador we can see an entrepreneurial aspiration deficit, while in Colombia shows a different picture: entrepreneurial aspirations are high, while abilities-related sub-index shows a relatively lower level. Importantly. several specific differences in the performance at the urban-rural regional levels are found. First, it can be observed that within countries, *rural ecosystems always perform lower than urban ecosystems.*

Table 2: GEI ATT, ABT and ASP values and ranks of 22 South American regions, 2017

Region		Attitudes			Abilities			Aspirations			GEI		
		Rank*	*Rank***	ATT	Rank*	Rank**	ABT	Rank*	*Rank***	ASP	Rank*	Rank**	GEI
Colombia	Andina	3	*2*	43.17	3	*2*	33.68	2	*2*	42.27	2	*2*	39.70
	Caribe	12	*8*	36.55	10	*7*	25.86	7	*7*	30.22	9	*7*	30.88
	Pacífica	7	*4*	41.24	6	*4*	29.69	5	*5*	31.54	5	*4*	34.16
	Orinoquía	14	*10*	35.79	13	*10*	24.93	9	*9*	28.32	12	*9*	29.68
	Amazonía (COL)	15	***11***	35.71	15	***11***	24.24	6	*6*	30.76	11	*8*	30.24
	Andina Urban	4	*3*	42.65	2	***1***	34.03	1	***1***	43.65	1	***1***	40.11
	Andina Rural	2	***1***	44.12	4	*3*	31.24	4	*4*	33.59	4	*3*	36.32
	Caribe Urban	8	*5*	40.62	8	*5*	27.51	8	*8*	29.42	7	*6*	32.52
	Caribe Rural	10	*6*	39.62	12	*9*	25.47	12	***11***	23.08	13	*10*	29.39
	Pacifica Urban	11	*7*	37.04	9	*6*	26.89	3	*3*	34.24	6	*5*	32.72
	Pacifica Rural	13	*9*	36.41	11	*8*	25.80	11	*10*	24.83	14	***11***	29.02
	Colombia averages		39.35			28.12			31.99			33.15	
Ecuador	Sierra	19	*4*	26.40	17	*2*	19.48	17	*2*	15.03	17	*2*	20.30
	Costa	18	*3*	26.52	20	*5*	17.58	19	*4*	12.81	19	*4*	18.97
	Amazonía (EC)	22	***7***	18.90	22	***7***	15.58	22	***7***	8.280	22	***7***	14.25
	Sierra Urban	17	*2*	27.19	16	***1***	20.39	16	***1***	16.7	16	***1***	21.43
	Sierra Rural	20	*5*	25.21	19	*4*	17.79	21	*6*	11.57	20	*5*	18.19
	Costa Urban	16	***1***	27.47	18	*3*	18.05	20	*5*	12.18	18	*3*	19.23
	Costa Rural	21	*6*	23.91	21	*6*	15.70	18	*3*	12.82	21	*6*	17.48
	Ecuador averages		25.08			17.79			12.77			18.55	
Uruguay	Montevideo	1	***1***	47.19	1	***1***	37.84	10	***1***	25.39	3	***1***	36.81
	Interior	6	*2*	41.31	7	*3*	28.63	14	*3*	22.08	10	*3*	30.67
	Interior Urban	5	*3*	41.58	5	*2*	30.34	13	*2*	22.39	8	*2*	31.44
	Interior Rural	9	***4***	40.42	14	***4***	24.46	15	***4***	21.20	15	***4***	28.69
	Uruguay averages		42.62			30.31			22.76			31.90	

*Note: *Rank = 22 region ranking. **Rank = INTER-regional rankings. Red highlight = lowest scoring region among 22 regions, orange highlight = second lowest scoring region among 22 regions, green highlight = best scoring regions among 22 regions, light green= second best scoring region among 22 regions. Red font colour = lowest performing region within the given country, green font colour = best performing region within the given country.*

Source: Adapted from Calispa-Aguilar (2022).

Table 3 shows the "top three" most constraining bottlenecks for each region. Overall, process innovation is the most severe bottleneck (i.e., number one weakest pillar) for 10 of the 22 regions. Process innovation aims to measure the ability to use new technologies by start-ups.

Table 3: The least favourable pillars for Colombian, Ecuadorian, and Uruguayan regions.

MACRO REGIONS			
	1st	2nd	3rd
Andina	Process Innovation	Risk Acceptance	Opportunity Startup
Caribe	Process Innovation	Technology Absorption	Competition
Pacífica	Process Innovation	Technology Absorption	Risk Capital
Orinoquía	Process Innovation	Technology Absorption	Product Innovation
Amazonía (COL)	Technology Absorption	Product Innovation	Networking
Sierra	Risk Acceptance	Internationalisation	High Growth
Costa	Internationalisation	High Growth	Risk Acceptance
Amazonía (ECU)	High Growth	Risk Acceptance	Internationalisation
Interior	Risk Capital	Internationalisation	Product Innovation
URBAN REGIONS			
	1st	2nd	3rd
Andina Urban	Process Innovation	Risk Acceptance	Competition
Montevideo	Risk Capital	Internationalisation	Competition
Caribe Urban	Process Innovation	Technology Absorption	Risk Capital
Pacifica Urban	Process Innovation	Competition	Technology Absorption
Interior Urban	Risk Capital	Internationalisation	Product Innovation
Sierra Urban	Risk Acceptance	Internationalisation	High Growth
Costa Urban	Internationalisation	Risk Acceptance	High Growth
RURAL REGIONS			
	1st	2nd	3rd
Andina Rural	Process Innovation	Opportunity Startup	Risk Acceptance
Caribe Rural	Process Innovation	Technology Absorption	Internationalisation
Pacifica Rural	Process Innovation	Risk Capital	Technology Absorption
Interior Rural	Risk Capital	Technology Absorption	Internationalisation
Sierra Rural	Risk Acceptance	Internationalisation	High Growth
Costa Rural	High Growth	Internationalisation	Risk Acceptance

Note: dark grey highlight = most severe bottleneck, light grey highlight = most common bottleneck.
Source: Calispa-Aguilar (2022, p.67)

Having a look of the relative position on the 1-to-3 categorisation of the least favourable pillars in Table 3, its apparent that each *configuration of the "top three "bottlenecks is unique in each urban and rural region.* Although there are similar pillars constraining regional systems of entrepreneurship, it is evident that some ecosystem elements are performing at different levels in the urban and rural areas within the same main region. Moreover, s*pecific bottleneck pillars for urban-rural regions are also evident*. In Colombia, while process innovation is the least favourable pillar for almost all regions, for Colombian Amazon region (which is fundamentally rural) the most severe bottleneck is technology absorption. In Ecuador, internationalisation is the most severe bottleneck for Costa Urban ecosystems while for Costa rural ecosystems is high growth. Another observed difference concerns the severity of bottlenecks among urban and rural regions. Summarily, these results suggest that attention should be paid to designing policies that address specific aspects of urban and rural entrepreneurial systems.

4. Fuzzy-set QCA: A novel method for contextualised EE research

Literature review showed that both entrepreneurship in urban and rural entrepreneurship are overall influenced by the same factors. Scholars agree that aspects such as culture, policy, formal institutions, government, opportunity startup, talent, knowledge, networks, leadership, human capital, startup skills, high growth aspirations, startup skill, technology adoption capacity, supports, markets and demand, physical infrastructure and finance are of universal relevance for entrepreneurship both in urban and rural contexts. Questions remain about the differences in how entrepreneurial ecosystems operate, that is, how these important factors interact to "produce" entrepreneurship. At this point, several complex questions, such as are all the ecosystem's factors equally necessary for supporting entrepreneurship in urban and rural areas? Do entrepreneurial ecosystems operate differently in urban and rural areas? Is a general configuration of elements, a "recipe", that leads to high levels of regional entrepreneurship in cities and rural areas? These remain unanswered. The first empirical study showed differences in the performance (key strengths and bottlenecks) of rural and urban regional EE. This study provides additional evidence about the key differences between urban and rural EEs from a configurational perspective. In this study, I conducted fuzzy-set Qualitative Comparative Analysis (fs/QCA) to explore the differences between ecosystem configurations among urban and rural regions in 42 sub-national regions in Colombia and Ecuador.

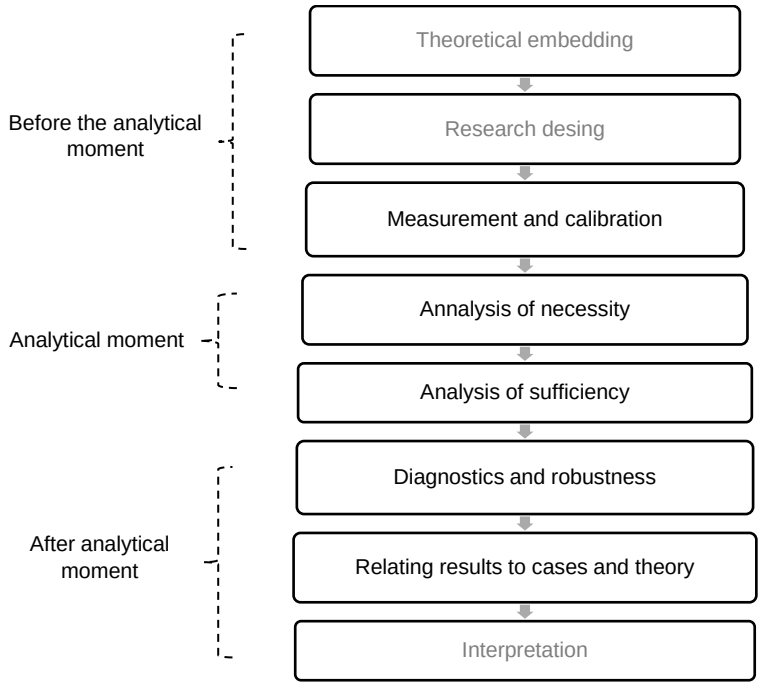
4.1. Method: Qualitative Comparative Analysis (QCA)

QCA is a method that analyses complex situations among and intermediate number of cases, typically between 10 and 50. By identifying how different combinations of conditions lead to the presence or absence of a specific outcome, it can help researchers explain why change happens in some cases but not others. QCA is based on set theory and conversely to regression-based methods, the key issue of configurational thinking is not identifying which variable is the strongest (i.e., has the biggest net effect) but how different conditions combine and whether there is only one combination or several different combinations of conditions (causal recipes) capable of generating the same outcome (Ragin,2008). A configurational approach is advantageous because, in contrast to other techniques like linear regression, QCA method can provide answers not only to the strength of relationships between explanatory conditions -variables- and an outcome but also about how the combination of those conditions produces the outcome by identifying cross-case patterns. In this sense, QCA permits examining complex combinations of explanatory variables as antecedents of the outcome. QCA helps identifying which elements jointly explain the outcome and how do these elements combine into configurations.

Stages of QCA

QCA studies are meant to follow a rigorous process including a set of quite well-defined steps. In this dissertation, QCA was performed following the set of steps displayed in Figure 2.

Figure 2: Steps of QCA



Note. Gray indicates and aspect not specific to QCA
Source: adapted from (Oana, Schneider, & Thomann, 2021)

4.2. fs/QCA Research problem and model specification

Previous research has stablished that entrepreneurship is an important driver of regional economic growth and innovation. However, less is known about the existent regional entrepreneurship disparities, and it is not clear why do certain regions have higher levels of entrepreneurial activity than others. In this line, studies show that more is known about ecosystems in large, urbanized regions, located primarily in developed economies and little attention has been paid to understanding differences in ecosystems functioning in smaller, non-urban regions. Entrepreneurial ecosystems are complex structures composed of a multilateral set of partners and environmental features that need to *interact* to materialize entrepreneurship (Adner, 2017; Roundy, Bradshaw, & Brockman, 2018). Therefore, useful insights to understand regional disparities could arise from understanding of the differences in the nature of high performing and low performing regional entrepreneurial ecosystems both in urban and non-urban regions.

An important goal of this research is to identify the main determinants of regional entrepreneurship in 42 subnational regions in Colombia and Ecuador. This study conceptualises and measures entrepreneurship from two perspectives: quality entrepreneurship – or productive entrepreneurship- and quantity entrepreneurship – or entrepreneurial activity

following the "Kirznerian" and "Schumpeterian entrepreneurship" concepts proposed by Szerb et al. (2019). Using fuzzy-set Qualitative Comparative Analysis (fs/QCA), I explore the configurations of urban, intermediate, and rural regions which result in low or high level of quality and quantity entrepreneurship within these three types of ecosystems.

Case selection

A total of 42 subnational regions were selected for this study: 23 provinces in Ecuador and 19 departments in Colombia. To create three sub datasets based on the regional urban-rural typology, the total 42 selected regions were categorized into three groups according to their type which was determined based on the European Commission urban-rural typology methodology[1]. Regions in the EU are classified as predominantly urban (PU), intermediate, or predominantly rural (PR) based on the percentage of population living in local rural units.

Condition selection

In order to define number of ecosystem elements in this study, I employed the GEI index conceptual model of Ács, Szerb, Lafuente, & Márkus, (2019) which discloses detailed definitions regarding the elements of an entrepreneurial ecosystem and its measurement. The GEI has been adopted as the theoretical criteria for defining the fs/QCA model in this study because it precisely establishes the core constituent elements of a regional entrepreneurial ecosystems and its systemic interrelationships. Nevertheless, the 14 constituent pillars (potential conditions) of the GEI methodology remains too great for an intermediate-N fs/QCA analysis. fs/QCA method is computationally limited to small groups of conditions due to the methodological "limited diversity" problem. Therefore, to overcome this computational issue the fs/QCA model was limited to seven conditions derived from the 14 GEI pillars. In this way, the logical space for this study is reduced to 2^7 = 128 potential combinations. Importantly, none of the pillars was omitted, as pillars were not discarded but merged. The model seven conditions' values were calculated using a combination of individual and institutional regional data following the GEI index building methodology.

Outcome variables selection

Efficient entrepreneurial ecosystems are said to produce entrepreneurship as an output (Stam & van de Ven, 2021). In this study, the "Kirznerian" and "Schumpeterian entrepreneurship" concepts proposed by Szerb et al. (2019) are taken as a basis for selecting four outcome variables for the fs/QCA models. I employ the regional young fast-growing enterprises (gazelles) and the ratio of creative industries as a proxy of "Schumpeterian entrepreneurship". The regional "gazelles" are the percentage of the TEA businesses having high job expectation average (over 10 more employees and 50% employment growth in 5 years). Data for the calculation of this indicator comes from GEM. The second measurement of productive entrepreneurship is the ratio of firms in creative industries. Creative industries are those within selected ISIC industrial classifications: J (information and communication), K (financial and insurance activities), L (Real estate activities), M (professional, scientific, and

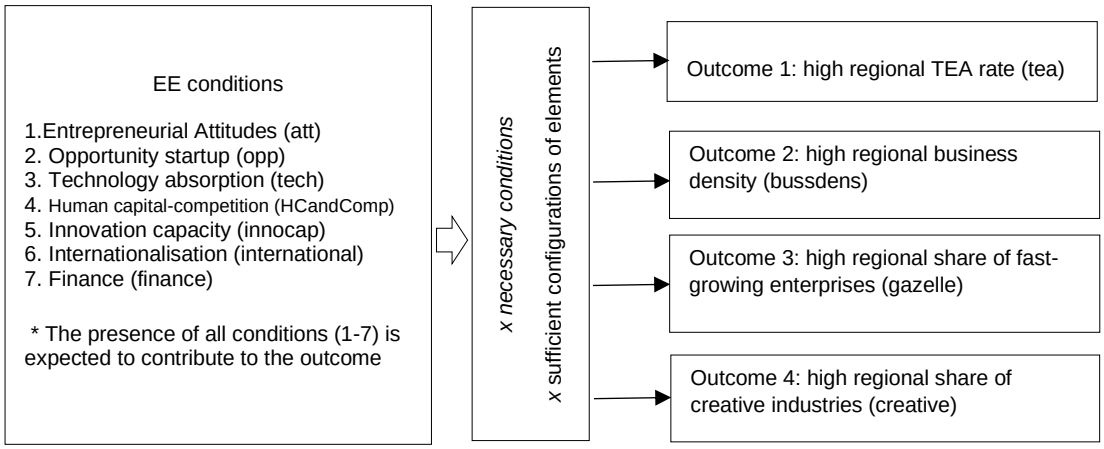
[1] Full methodology description at https://ec.europa.eu/eurostat/web/rural-development/methodology

technical activities), P (education), and R (arts, entertainment, and recreation). On the other hand, Total early-stage Entrepreneurial Activity (TEA) rate and regional business density has been selected as a proxy of "Kirznerian entrepreneurship".

Overview of fs/QCA model

Figure 3 presents a visual representation of the proposed fs/QCA model where the central idea is that the high levels of an EE outcome is contingent to a specific set of necessary conditions and to different configurations of elements. The number of necessary conditions (if any) for each outcome measurement and the number of sufficient configurations is unknown, *x*, and will be revealed by fs/QCA analysis.

Figure 3: Seven - condition fs/QCA model for quantity and quality entrepreneurship



Source: own elaboration

4.3. Results

fs/QCA analysis of necessary conditions

A necessary condition is a condition that *must* be present for the outcome to achieve. So, for regions to achieve high levels of entrepreneurship they must always must a strong presence of these conditions. To be considered "necessary" or "almost always necessary", a condition must show a consistency score that exceeds the threshold of 0.90 or 0.80 and a non-negligible coverage (Ragin, 2008; Schneider & Wagemann, 2012) Table 4 summarize the results from necessity analysis for predominantly urban, intermediate, and predominantly rural regions. Necessary and almost always necessary conditions have been highlighted.

Table 4: Results of the fs/QCA analysis of necessary conditions (consistency scores)

Ecosystem condition	Quantity entrepreneurship						Quality entrepreneurship					
	TEA			Business Density			Gazelles			Creative industries		
	U	I	R	U	I	R	U	I	R	U	I	R
Entrepreneurial attitudes												
Attitudes	NN	NN	NN	NN	NN	NN	NN	NN	NN	0.98	NN	NN
Entrepreneurial abilities												
Opportunity startup	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN
Technology absorption	NN	NN	NN	NN	NN	NN	0.95	0.91	NN	NN	NN	NN
Human capital-competition	NN	NN	NN	NN	NN	NN	0.80	0.98	NN	NN	NN	NN
Entrepreneurial aspirations												
Innovation capacity	NN	NN	NN	NN	NN	NN	0.95	0.98	0.81	0.87	NN	NN
Internationalisation	NN	NN	NN	NN	NN	NN	0.99	0.94	0.97	NN	NN	NN
Finance	NN	NN	NN	NN	NN	NN	0.82	0.82	0.83	0.81	NN	NN

Note: NN Not necessary (consistency score < 0.80). Highlighted = necessary conditions (consistency score > 0.80). U = predominantly urban, I = intermediate, R = predominantly rural.
Source: own elaboration

The results of fs/QCA analysis of necessary conditions summarized in Table 4 indicate that:

a) The ecosystem conditions are not equally necessary for all cases and, the level of necessity of each condition is contingent upon the geographical typology of the ecosystem and the desired outcome.

b) No single condition was necessary for explaining high levels of "quantity" entrepreneurship (in this case measured as regional business density and regional TEA rate). This is true for all types of ecosystems (predominantly urban, intermediate, and predominantly rural).

c) Ecosystem conditions become necessary when the expected outcome is high levels of "quality" entrepreneurship (in this case measured as regional share of gazelle firms or regional share of creative industries). This is true for all types of ecosystems (urban, intermediate, rural).

d) In this vein, a high presence of gazelle firms is the "hardest" most challenging ecosystem's outcome to achieve. Urban and intermediate regions aiming to support the rise of high rates of regional gazelle firms require an almost all-round ecosystem where five out of the seven ecosystem conditions are necessary (necessity consistency score ≥ 0.80).

Evaluation of Necessity fs/QCA *propositions*

Based on data from fs/QCA analysis of necessary conditions, Table 5 presents a summary of the results and its relationship with the necessity propositions.

Table 5: fs/QCA Necessity propositions

Statement	Results
"The presence of regional population able to recognize and take advantage of entrepreneurial opportunities and the institutional environment supporting entrepreneurial attitudes is necessary for the presence of regional entrepreneurship"	This statement is true only for achieving high levels of creative industries in urban regions. High levels of entrepreneurial attitudes are not necessary for high levels of quantity entrepreneurship nor for high levels of gazelle firms.
"The presence of high level of regional opportunity startup is necessary for the presence of regional entrepreneurship"	This statement is not true for any case. High levels of opportunity startup are not necessary for achieving quality nor for achieving quantity entrepreneurship.
"The presence of high levels of regional technology absorption capacity is necessary for the presence of regional entrepreneurship"	High level of technology absorption capacity is necessary only for gazelles in urban and intermediate regions.
The presence of high level of human capital and competition is necessary for the presence of regional entrepreneurship.	High level of human capital-competition is almost always necessary for gazelles in urban regions while it is always necessary for gazelles in intermediate regions. Human capital-competition is not necessary for the presence of quantity entrepreneurship.
The presence of high regional innovation capacity is necessary for the presence of regional entrepreneurship.	Innovation capacity is always necessary for gazelles in urban and intermediate regions and almost always necessary in rural regions. High level of innovation capacity is almost always necessary for creative industries in urban regions. Quality entrepreneurship does not require the necessary presence of high regional innovation capacity.
The presence of a high level of regional internationalisation capacity is necessary for the presence of regional entrepreneurship.	High level of internationalisation is always necessary for the presence of gazelle firms in urban, intermediate, and rural regions. Internationalisation is not necessary for achieving quantity entrepreneurship.
The wide availability of inclusive regional financing and strong capital market is necessary for the presence of regional entrepreneurship.	The presence of inclusive financing and a strong regional capital market is almost always necessary for gazelle firm in urban, intermediate, and rural regions. Financing is also always necessary for creative industries in urban regions. Financing is not necessary for achieving quantity entrepreneurship.
All ecosystem elements are equally necessary for achieving an outcome	This is false for all regions and outputs. Ecosystem elements' degree of necessity are different within and among regions. Furthermore, elements' degree of necessity also varies depending on the outcome measurement employed.
The degree of necessity of the ecosystem elements is sensitive to the outcome measure variable employed (Methodological proposition1).	This is true in all cases. The degree of necessity of the ecosystem elements is different for business density, TEA rates, gazelle firms and creative industries share.

Source: own elaboration

fs/QCA analysis of sufficient conditions

Having completed the analysis of necessity, the next methodological step was to identify the configurations of ecosystem's factors required for high level of quantity and quality entrepreneurship. The next section presents the causal paths, "recipes" that lead to a high level of regional business density, TEA rate, gazelle firms and share of creative industries in predominantly urban, intermediate, and predominantly rural regions. At this stage, it is suggested that researchers should create a table that will show both *core and peripheral condition*. Core conditions are those conditions present in both parsimonious and intermediate solutions and the evidence indicates a strong causal relationship with the outcome of interest. Conversely, peripheral conditions are present only in the intermediate solution and the evidence for a causal relationship with the outcome is weaker. The results of sufficiency analysis in this study are presented in the form of the so called "Fiss-style tables" where black circles (●) indicate the presence of a condition and the circle with a cross (⊗) indicate its absence. Large circles distinguish core conditions from peripheral ones (Fiss, 2011). In fs/QCA, a researcher usually concludes that a model is informative when consistency is above 0.74 and coverage is between .25 and .65 (Ragin, 2008; Woodside, 2013). In Fiss-style tables, each column represents an alternative causal recipe, that is, a combination of conditions that associate to the respective outcome.

Paths for high levels of "Quantity entrepreneurship"

Table 6 present the results of the fs/QCA for high levels of regional TEA in urban, intermediate, and rural regions. In a sum, high levels of regional TEA in *urban regions* are led by a highly developed entrepreneurial attitudes (solutions 1,2,3,7,8) or by a combination of the presence of opportunity startup and finance availability (solutions 4-6). For *intermediate regions*, there are five sufficient configurations. Solution 1a to 4a share a high presence of entrepreneurial attitudes and finance and low internationalisation (1a), low innovation capacity (2a), low human capital-competition (3a), and low opportunity startup(4a). Solution 5a includes the presence of high entrepreneurial attitudes, high opportunity startup and technology absorption and low finance. For *rural regions*, there are six sufficient configurations that explain a very high regional TEA. Solutions 1b to 5b share the presence of high level of human capital-competition and finance combined with low innovation capacity (1b), low internationalisation (2b), low opportunity startup and technology absorption (3b), low entrepreneurial attitudes (4b), and low entrepreneurial attitudes and technology absorption (5b). Solution 6b includes the presence of five of the seven conditions: entrepreneurial attitudes, opportunity startup, technology absorption, innovation capacity, internationalisation combined with low finance.

Overall, it can be observed that high rate of TEA in are led by relatively *simple* recipes where the presence of only one, two or maximum three well developed factors are in most cases enough to lead to the outcome. It can thus be suggested that TEA is a relatively easy-to-achieve entrepreneurial output to achieve and can be sustained almost naturally in every ecosystem type (urban, intermediate, and rural).

Table 6: Configurations for achieving a high level of quantity of regional entrepreneurship (regional TEA)

	High TEA																		
	Urban								Intermediate					Rural					
	1	2	3	4	5	6	7	8	1a	2a	3a	4a	5a	1b	2b	3b	4b	5b	6b
Entrepreneurial attitudes																			
Attitudes	●	●	●				●	●	•	•	•	●	•				⊗	⊗	•
Entrepreneurial abilities																			
Opportunity startup			⊗	●	●	●						⊗	●		⊗	⊗			•
technology absorption						⊗		⊗					●			⊗		⊗	•
Human capital-competition		⊗									⊗			•	•	•	•	•	
Entrepreneurial Aspirations																			
Innovation capacity	⊗				⊗					⊗				⊗					●
Internationalisation				⊗			⊗		⊗						⊗		⊗		•
Finance		⊗	⊗	●	●	●	⊗	⊗	●	●	●	●	⊗	●	●	●	●	●	⊗
Raw coverage	0.367	0.309	0.312	0.306	0.464	0.439	0.300	0.309	0.226	0.226	0.222	0.143	0.200	0.203	0.210	0.228	0.195	0.228	0.175
Unique coverage	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.000	0.008	0.000	0.000	0.000	0.154
Consistency	0.699	0.667	0.831	0.871	0.874	0.873	0.656	0.829	0.725	0.640	0.765	0.528	0.705	0.593	0.874	0.900	0.885	0.918	0.627
Overall solution coverage	0.688								0.418					0.397					
Overall solution consistency	0.624								0.592					0.649					
Regions	Guayas (ECU)	Guayas (ECU)	Guayas (ECU)	Meta (COL)	Meta (COL)	Meta (COL)	Guayas (ECU)	Guayas (ECU)	Imbabura (ECU)	Imbabura (ECU)	Imbabura (ECU)	Imbabura (ECU)	Santa Elena (ECU)	Napo (ECU)	Napo (ECU)	Napo (ECU)	Napo (ECU)	Napo (ECU)	Chimborazo (ECU)

Source: own elaboration

Table 7 summarizes the paths for high level of regional *business density*. I*n urban regions* there is one only sufficient configuration where most of the components are indifferent for the outcome. High level of *business density in intermediate regions* is led by a combination of presence of attitudes and finance. There are 4 sufficient configurations. Solutions 1d to 4d share the presence of high level of entrepreneurial attitudes and finance combined with low internationalisation (1d), low innovation capacity (2d), low human capital-competition (3d) and low opportunity startup (4d). Finance is a core condition in three of the 4 solutions while entrepreneurial attitudes is core for the last solution (4d). For high level of regional *business density in rural regions* there are two sufficient configurations. The first configuration (1e) includes the presence of high entrepreneurial attitudes and internationalisation combined with low level of technology absorption. The second configuration (2e) also includes the presence of high entrepreneurial attitudes and internationalisation, and it is characterized by low opportunity startup.

Table 7: Configurations for achieving a high level of quantity of regional entrepreneurship (regional business density)

	Business Density						
	Urban	Intermediate				Rural	
	1c	1d	2d	3d	4d	1e	2e
Entrepreneurial attitudes							
Attitudes		•	•	•	●	•	●
Entrepreneurial abilities							
Opportunity startup	⊗				⊗		⊗
Technology absorption						⊗	
Human capital-competition	⊗			⊗			
Entrepreneurial Aspirations							
Innovation capacity			⊗				
Internationalisation		⊗				●	•
Finance		●	●	●	●		
Raw coverage	0.747	0.219	0.219	0.215	0.137	0.352	0.295
Unique coverage	0.747	0.000	0.000	0.000	0.000	0.109	0.052
Consistency	0.756	0.718	0.634	0.758	0.520	0.708	0.452
Overall solution coverage	0.747	0.219				0.404	
Overall solution consistency	0.756	0.493				0.473	
Regions	Azuay (ECU), Guayas (ECU), Pichincha (ECU)	Imbabura (ECU)	Imbabura (ECU)	Imbabura (ECU)	Imbabura (ECU)	Bolívar (ECU)	Bolívar (ECU)

Source: own elaboration

Paths for high levels of "Quality entrepreneurship

The results of the fs/QCA for high levels of quality entrepreneurship, measured trough two indicators; regional gazelles and regional creative firms, are presented below.

Table 8: Configurations for achieving a high level of quality of regional entrepreneurship (share of regional gazelles).

	Gazelle						
	Urban		Intermediate		Rural		
	1f	2f	1g	2g	1h	2h	3h
Entrepreneurial attitudes							
Attitudes		•	•		•	●	
Entrepreneurial abilities							
Opportunity startup	•		⊗	⊗		⊗	
technology absorption	●	•	•	•	⊗		●
Human capital-competition		•	●	●			●
Entrepreneurial Aspirations							
Innovation capacity	•	•	●	●			•
Internationalisation	•	●	●	●	●	●	●
Finance	●	●		•			•
Raw coverage	0.561	0.578	0.254	0.325	0.289	0.491	0.649
Unique coverage	0.206	0.224	0.121	0.192	0.017	0.024	0.398
Consistency	0.985	0.961	0.992	0.848	0.635	0.821	1.000
Overall solution coverage	0.785		0.446		0.908		
Overall solution consistency	0.971		0.881		0.769		
Regions	Cundinamarca (COL), Valle del Cauca (COL)	Cundinamarca (COL), Atlántico (COL)	Sucre (COL)	Magdalena (COL)	Bolívar (ECU)	Bolívar (ECU)	Guajira (COL)

Source: own elaboration

Table 8 summarizes the paths for high level of regional *gazelles*. For *urban regions*, there are 2 sufficient configurations (1f, 2f). The first configuration is based on the presence of opportunity startup, technology absorption, innovation capacity, internationalisation, and finance while entrepreneurial attitudes and human capital-competition are conditions that "doesn't matter" for the outcome. The second configuration is an almost all-round path and requires the presence of six of the seven conditions: strong entrepreneurial attitudes, technology absorption, human capital-competition, internationalisation capacity and availability of financing. Achieving high levels of *gazelle firms in intermediate regions* also requires complex configurations of elements. For intermediate regions there are two solutions which are variations of the same type because human capital-competition, innovation capacity, and internationalisation are core in both. *For rural regions*, there are 3 sufficient configurations (1h-3h). The first configuration (1h) is based on the presence of high

entrepreneurial attitudes and strong internationalisation capacity combined with low technology absorption. The second configuration (2h) combines presence of entrepreneurial attitudes and internationalisation capacity combined with low opportunity startup. The third configuration (3h) is relatively more complex and includes the presence of high level of technology absorption, human capital-competition, innovation capacity, internationalisation, and finance.

Table 9 summarizes the paths for high level of regional share of *creative industries*. There are four configurations for high levels of regional share of *creative industries in urban regions*. Solutions 1i-3i share strong entrepreneurial attitudes, high innovation capacity and availability of financing combined with low internationalisation (1i), low human capital-competition (2i) and low technology absorption (3i). All components of solutions 1i-3i are core. The fourth configuration is quite similar, but it includes the presence of strong entrepreneurial attitudes, opportunity startup, innovation capacity and high level of financing. In this case, innovation capacity is a periphery condition while entrepreneurial attitudes, human capital-competition and internationalisation remain indifferent for the outcome.

Table 9: Configurations for achieving a high level of quality of regional entrepreneurship (share of creative industries)

	Creative Industries											
	Urban				Intermediate						Rural	
	1i	2i	3i	4i	1j	2j	3j	4j	5j	6j	1k	2k
Entrepreneurial attitudes												
Attitudes	●	●	●	●	•	•	●	•	•	•		•
Entrepreneurial abilities												
Opportunity startup				●			⊗	●		•	●	•
Technology absorption			⊗								⊗	
Human capital-competition		⊗				⊗		●		●		
Entrepreneurial Aspirations												
Innovation capacity	●	●	●	•	⊗			●		●		●
Internationalisation	⊗								⊗	⊗		•
Finance	●	●	●	●	●	●	●	⊗	●			⊗
Raw coverage	0.251	0.283	0.270	0.469	0.231	0.234	0.159	0.187	0.231	0.159	0.550	0.179
Unique coverage	0.000	0.000	0.000	0.322	0.000	0.013	0.004	0.032	0.000	0.000	0.427	0.056
Consistency	0.653	0.879	0.680	0.929	0.677	0.833	0.610	0.889	0.768	0.915	0.690	0.694
Overall solution coverage	0.606				0.352						0.606	
Overall solution consistency	0.805				0.648						0.662	
Regions	Pichincha (ECU)	Pichincha (ECU)	Pichincha (ECU)	Cundinamarca (**COL**)	Imbabura (ECU)	Imbabura (ECU)	Imbabura (ECU)	Loja (ECU)	Imbabura (ECU)	Loja (ECU)	Sucumbíos (ECU)	Chimborazo (ECU)

Source: own elaboration

For intermediate regions, there are six sufficient configurations that lead to high regional share of creative industries. In general, in *intermediate regions*, high level of creative industries can be held by two types of ecosystems: one with strong presence of entrepreneurial attitudes and finance, and one ecosystem characterized by the presence of entrepreneurial attitudes, opportunity startup, human capital-competition, innovation capacity, and the lack of financing. *For rural regions*, there are two sufficient configurations. (1k, 2k). The first configuration is based on the presence of strong opportunity startup and low technology absorption while all the other conditions remain indifferent for the outcome. The second configuration is based on the presence of entrepreneurial attitudes, opportunity startup, strong innovation capacity, internationalisation capacity and lack of finance. In this case, only the presence of innovation capacity is a core condition. Moreover, technology absorption and human capital-competition remain indifferent for the outcome.

Table 10 summarises the results presented in this section and its relation to the proposed sufficiency statements.

Table 10: fs/QCA Sufficiency propositions

Statement	Result
There are different ways (causal paths, or solutions) to a successful entrepreneurial ecosystem	This is true for all regions and almost all outcome measures employed, except by the case of business density in urban regions. In most cases, there are at least two different ways how a region can reach high levels of a selected entrepreneurial outcome.
The causal paths to successful entrepreneurial ecosystems are different in urban and rural regions.	This is true for all outcomes. No path is the same in any case. Each type of region, and each selected entrepreneurial outcome requires a unique configuration of ecosystem elements. Causal paths are substantially different among urban and rural regions.
Sufficient ecosystem configurations that lead to high levels of entrepreneurship are sensitive to the outcome measurement employed (Methodological proposition 2).	This is true for all cases. Ecosystems work differently to enable high levels of business density, high TEA rates, high share of gazelle firms, and high share of creative industries. No ecosystem configuration is the same among these four outcomes.

Source: own elaboration

5. Theses of the doctoral dissertation

5.1. Theses

In the first stage of my dissertation, literature on rural entrepreneurship was systematically assessed. The main themes arising from this body of literature were analysed against three well-known EEs models to determine to what extent rural entrepreneurial ecosystems are distinct from non-rural entrepreneurial ecosystems. In this regard, I found there are common, "place-neutral" factors mutually important for both urban and rural entrepreneurship, but there are three other "place/context-sensitive" factors that represent rurality not yet embedded in well-known EEs framework models (RQ 1.1). According to literature, rural poverty, territorial

capital: natural and human resources endowments in rural locations, and peripheral location play an important role in rural entrepreneurship. However, these aspects are not yet covered in standard EE framework models (RQ 1.2). Therefore, I assert that unless these place/context-sensitive factors are incorporated into standard EE frameworks, these remain "decontextualised" to rural contexts and, therefore, these can only *partially* reveal, measure, and evaluate *rural* EE (RQ 1.3).

Based on the findings of the systematic literature review in chapter 2 (subchapters 2.2, 2.4), *I accept Hypothesis 1 (H1)* and form the following Thesis 1 (T1):

THESIS 1

The well-known theoretical framework models were designed to primarily measure the EE performance of large, urbanized and developed regions. Consequently, these EE models can only partially be used for measuring the performance of rural EE as they do not consider many place-sensitive factors of rural areas: rural poverty, territorial capital: natural and human resources endowments in rural locations, and peripheral location. In this sense, these theoretical framework models of EE are not "contextualized" enough.

The second step to find out differences between urban and rural EEs was to empirically investigate which EE components hinder rural and urban entrepreneurship? (RQ2). To this end, I conducted an empirical study where I calculated regional GEI scores for ten macro regions in Colombia and Ecuador, and due to the availability of data, I could also calculate GEI scores for the urban and rural areas within six of these ten macro regions. The empirical evidence shows differences between regions in three aspects. First, based on the Regional GEI scores, rurality seems to decrease the overall performance of EEs. In all cases, although belonging to the same macro region, rural ecosystems always score lower than urban ecosystems. Second, the GEI's pillar level data reveals *specific bottleneck pillars for urban-rural regions.* Although the constraining pillars are mostly the same for both urban and rural regions within macro regions, there are partially different configurations of weaknesses and strengths for some urban and rural subregions. In Colombia, while process innovation is the least favourable pillar for most regions, for the Colombian Amazon region (which is fundamentally rural), the most severe bottleneck is technology absorption. In Ecuador, internationalisation is the most severe bottleneck for Costa Urban ecosystems, while for Costa rural ecosystems is high growth.

Third, looking at the relative position on the 1-to-3 categorisation of the least favourable pillars, it is evident that each configuration of the "top three" bottlenecks is unique in each urban and rural region. This implies that the *severity* of bottlenecks among urban-rural regions is different. Although similar pillars constrain regional systems of entrepreneurship, some ecosystem elements perform at different levels in the urban and rural areas within the same main region. An implication of the variation in scores and individual element performance within urban and rural regions is the possibility that the rural populations' ATT, ABT, and ASP differ from those of their urban counterparts. Therefore, the urban-rural nature of regions

should be carefully considered, as each might require customised policy strategies to alleviate specific bottlenecks of urban and rural regions within a single macro region.

Based on the findings of the regionalised GEI empirical study results in chapter 4, *I accept Hypothesis 2 (H2)* and form the following Thesis 2 (T2):

THESIS 2

Thesis 2 (T2) The significance and performance of the pillars of entrepreneurial ecosystems significantly differ for urban and rural regions. First, rural ecosystems perform overall lower than their urban counterparts. Second, compared to urban regions, in rural areas other bottleneck pillars of EE determine entrepreneurship performance.

Having found insights about performance and bottlenecks differences between urban and rural EEs, the following step was to explore these ecosystems in a more complex way focusing on the natural complexity of EE factor interrelatedness. To this end I conducted an empirical study in the determinants of entrepreneurship in 42 urban and rural regions in Colombia and Ecuador using the fsQCA method. On the one hand, the results of fs/QCA necessity analysis, reveal that the ecosystem elements are not equally important *within the urban and rural ecosystems.* In *urban* regions, a well-developed technology absorption capacity, human capital-competition, innovation capacity, internationalisation capacity, and regional financial availability are necessary for high rates of regional gazelle firms. Moreover, entrepreneurial attitudes, innovation capacity and financial availability are necessary for supporting a high share of creative industries in urban regions. No single condition was necessary for explaining high levels of "quantity" entrepreneurship (regional business density and regional TEA rate). In *rural* regions, high innovation capacity, internationalisation capacity, and regional financial availability are necessary for high rates of regional gazelle firms. Moreover, entrepreneurial attitudes, innovation capacity and financial availability are necessary for supporting a high share of creative industries in urban regions. No single condition was necessary for explaining high levels of regional creative industries, not for regional business density and regional TEA rate in rural regions. Together these results suggest that while all EEs elements are important for the outcome, their weight/role is different depending on the urban-rural context and the expected entrepreneurial outcome. Furthermore, the necessary condition analysis results also evidenced that quality increases the necessity of ecosystem elements in urban and rural regions. Therefore, regions attempting to spur high-quality entrepreneurship *must* meet several preconditions while achieving high levels of quantity entrepreneurship does not have any preconditions.

But results of fs/QCA sufficiency analysis show that both quantity and quality entrepreneurship results from different EE configuration(s) in urban regions and in rural regions (Questions 3.1 and 3.2). These characteristics of paths for high level *quality and quality* entrepreneurship in urban regions:

- High levels of *TEA* are fostered either by the presence of a well-developed entrepreneurial attitude among the population or by a combination of strong opportunity start-ups with broad access to financing.
- *The* presence of none of the seven ecosystem factors is core on the path to achieving a high level of *business density* in predominantly urban regions, and five out of seven pillars remain indifferent to the outcome.
- High level of *urban gazelles* requires an ecosystem where most factors need to be present and well developed, and finance plays a key role while ecosystems drive high levels of creative industries in urban regions with the presence of supporting entrepreneurial attitudes, high regional innovation capacity, opportunity startup and favourable access to finance.
- Unlike gazelles, high entrepreneurial attitudes among the regional population are fundamental for *creative industries.*

These characteristics of paths for high level *quality and quality* entrepreneurship in rural regions:

- The presence of high level of human capital-competition and finance leads to high levels of regional *TEA.*
- The presence of entrepreneurial attitudes and internationalisation capacity are essential for achieving a high level of *business density.* A second path for high levels of rural business density in rural regions suggests that a high level of internationalisation is needed.
- Regarding quality entrepreneurship, in rural areas, there are three alternative paths for high levels of *gazelles,* and the presence of internationalisation is core for them. Interestingly, unlike in urban regions, for rural regions, finance is not essential, but internationalisation becomes the main driver for gazelles.
- A high regional share of *creative industries* in rural regions is fostered by either the presence of high opportunity start-ups or by a more complex ecosystem with the presence of a high level of entrepreneurial attitudes, opportunity startup, innovation capacity and internationalisation capacity.

Based on the findings of fs/QCA results in chapter 5 (subchapter 5.5), *I accept Hypothesis 3 (H3)* and form the following Thesis 3 (T3):

THESIS 3

Thesis 3 (T3). The way how ecosystem elements combine and influence the occurrence of high entrepreneurship outputs in rural and urban regions is different. Both, the levels of necessity (weight) of each EE element and the ecosystems' configurations that result in high-level entrepreneurship are specific in rural and urban regions.

5.2. Implications, research limitations and future research

The findings of this dissertation suggest several implications on an academic level. First, since the empirical studies of this dissertation are focused in Colombia and Ecuador, the findings presented here contribute to the scarce body of literature on rural entrepreneurship and entrepreneurial ecosystems in developing economies (Cao & Shi, 2021; Miles & Morrison, 2018; Muñoz & Kimmitt, 2019; Pato & Teixeira, 2016). Although the results are restricted to a small sample of regions within two countries, it provides an interesting case study for informing regional entrepreneurship development strategies and policies in South America. Moreover, findings about the operational distinctions between urban and rural ecosystems add to the literature suggesting caution that "one size does not fit all" when it comes to entrepreneurship policy, and rather than aiming for a generalisable, all-encompassing entrepreneurship policy, efforts should be oriented toward addressing local, regional needs and aims (Audretsch, 2019; Fabian & Achidi, 2015; Muñoz et al., 2020).

These ecosystems' strategies, and the way ecosystem elements combine to spur entrepreneurship, are essentially distinctive and unique between urban and rural ecosystems. In this same line, successful ecosystems do not exhibit one common perfect configuration. Instead, it can be observed that each ecosystem "finds a way" to function with a unique combination of some or fewer elements at a high level. Remarkably, the composition of causal paths for rural entrepreneurship (both quality and quantity) showed that rural ecosystems could function and succeed without having one or two elements at a high level. This finding contributes to Roundy's (2017) argument that thriving entrepreneurial communities can be developed in small towns that do not possess some – or many – of the "classic" pillars of entrepreneurial ecosystems in large metropolises. Consequently, policymakers interested in building successful ecosystems in their regions would not necessarily have to develop all competencies simultaneously. It can be the case when this approach is suitable (i.e., when the aim is to achieve high levels of quality entrepreneurship), and an almost all-around ecosystem is required to support entrepreneurship. However, these results provide evidence that most of the time, high performance of all ecosystems' elements is not necessary, suggesting that policy efforts can be rather optimised when directed towards those specific necessary and sufficient elements according to the entrepreneurial ecosystem.

A number of limitations need to be noted regarding the present study. First, due to data availability possibilities, the definition of regions' typology is defined based on the share of rural population. Thus, interpretation must be accordingly. Further studies could complement the validity of the present results by conducting similar investigation among smaller, more specific geographical units such as cities, smaller cities, and towns for instance. Lack of regional data was also a constrain for the calculation of some of the indicators and sometimes, national level data had to be combined with regional data. Consequently, this procedure reduced the variability in the data and might hide some important regional aspects. Second, I acknowledge that the derived results presented in this study are bounded by the selected countries conditions. Ecuador and Colombia are undoubtedly a relevant empirical context for studying ecosystems in developing economies in Latin America. However, further work is needed to conclude whether the results provided here, for Ecuador and Colombia are consistent with realities in other Latin American countries.

The pertinent questions regarding the use of fs/QCA are the third source of limitations (Baumgartner & Thiem, 2020; De Meur, Rihoux, & Yamasaki, 2009; Thiem, 2019). The result of fs/QCA analysis in this study are delimited by the authors' choices of case and conditions, fuzzy set calibration thresholds, and the approach to identify core and periphery conditions. Although based on previous empirical evidence or theoretical arguments, these decisions are might not be free of criticism. Furthermore, since QCA is computationally and conceptually limited to small groups of conditions, this study was limited to include 7 causal conditions in fs/QCA models. Ideally, including further constituent elements would improve the theoretical accuracy of the results, however this would turn QCA overcomplicated.

Finally, based on literature review, I found three distinguished factors of rurality which have an effect on rural entrepreneurship: rural poverty, territorial capital (human and natural resources) and peripheral location condition. Although acknowledging that these components are important for rural ecosystems, in this study, these factors were not added to the employed EE framework because the focus was not exclusively on exploring rural ecosystems but also comparing rural EE configuration to intermediate and urban ones. However, these three elements should be taken into account in future studies attempting to measure *only* rural EEs. In this same matter, literature review I found that rural poverty is directly linked to necessity-driven entrepreneurship. Therefore, empirically exploring whether this is the case in South American regions would add an important perspective for analysis.

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