

No size fits all - Exploring Entrepreneurship Measurement using Big Data, rare Events and Ecosystems

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Abstract

Entrepreneurship is one major factor influencing the world we live in. At that, the relationship between entrepreneurship and this world is an interdependent one and entrepreneurial activity in any given territory is an inherently economic geographical process. As a highly multidisciplinary research field, entrepreneurship has been analysed for decades, yet as the world progresses, the entrepreneurial phenomena evolve as well. Sophisticated research needs outstanding data. Plenty manifestations of entrepreneurship are not or not sufficiently covered by such data. There is a need to explore new methods and approaches for data on entrepreneurship to tackle unsolved issues and address newly developing phenomena. Some entrepreneurial events are so rare it is difficult to get quantitative data on them, making them dominated by qualitative case studies. Moreover, other areas in entrepreneurship are so complex, that reliable comparable data need a broad and coordinated approach.

This thesis addresses these issues as such, that it contributes to a more complete empirical data body, and it expands the understanding how bespoke methodology leads to phenomenon specific empirical data and ultimately to place based policies and is thus overall advancing entrepreneurship research. The thesis is built upon five core chapters of entrepreneurship research unified by the common theme of measuring entrepreneurial phenomena in a spatial context for reasons of comparison, in depth understanding or to find the right angle to push a regions endogenous potential for growth. New measures are explored through Big Data with a focus on media and press releases, thereby broadening the horizon on how Big Data can be used in entrepreneurship research. Internationally comparable data for the rare event of transnational diaspora entrepreneurship is methodologically conceptualized and then applied and analysed, thus covering this heterogeneous and small target group with comparable quantitative empirical data. The entrepreneurial ecosystem (EES) approach to entrepreneurship in a spatial context is then used to display the index creation of the Global Entrepreneurship Monitor's (GEM) Entrepreneurial Ecosystem Index (ESI). Lastly, data set enrichment of this ESI data through mixed methods is used to locate dysfunctions and shortcomings in the EES of a German region and demonstrate how GEM's ESI can help to procure place based policy implications. This thesis therefore closes multiple research gaps, both methodological and thematic, and contributes to the understanding of how such gaps can be closed. While there is a need to break open new approaches for data on entrepreneurship to explain newly risen phenomena, there is still a fundamental need for survey-based data with a design that can be adapted to different spatial scales as well as vastly diverse target groups, stages and research questions. The thesis shows, that the traditional survey design of data collection is by no means obsolete. Although new methods to expand the borders of entrepreneurship research have to be explored, there is still much to be researched within those borders. This thesis holds a plea for less theorizing, less milking of old datasets, but more problem specific approaches, mixing data sources and combining qualitative and quantitative data.

Keywords: Entrepreneurship, Economic Geography, Transnational Entrepreneurship, Big Data, Entrepreneurial Ecosystem, Global Entrepreneurship Monitor

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Reports

- von Bloh, J., A. Coduras, and R. Sternberg. 2018. GEM Entrepreneurial Ecosystem Index 2018 Pilot Report. Report for the Research Innovation and Advisory Committee (RIAC) of the Global Entrepreneurship Monitor (GEM).
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By students

Not listed are more than ten master theses and several bachelor theses written by students of the Institute of Economic and Cultural Geography as outcome of the Transnational Diaspora Entrepreneurship and Entrepreneurial Ecosystem research projects.

Press releases linked to the research projects

<https://www.haz.de/Hannover/Aus-der-Stadt/Wie-gut-ist-Hannovers-Gruenderszene>

<https://www.goettinger-tageblatt.de/Nachrichten/Hannover/Wie-gut-ist-Hannovers-Gruenderszene>

Table of Content

- Abstract.....2

- Acknowledgements.....4
- Research outputs linked to thesis projects6

- Table of Content8
- List of Figures 11
- List of Tables 11
- Abbreviations 12

- 1 Introduction 13
 - 1.1 Entrepreneurship and Economic Geography..... 13
 - 1.2 Measuring Entrepreneurship: The Challenges..... 19
 - 1.3 The Structure of this Thesis..... 21
 - 1.3.1 Composing Elements 21
 - 1.3.2 Thesis Outline 23
 - 1.4 Data 25
 - 1.4.1 The Global Entrepreneurship Monitor (GEM) 25
 - 1.4.2 Further Data Sets used in this Thesis and my Involvement 28
 - 1.5 Contribution 29

- 2 New(s) data for Entrepreneurship Research?..... 31
 - 2.1 Introduction 33
 - 2.2 Entrepreneurship and Media—some conceptual Thoughts and the Role of Big Data 36
 - 2.3 Empirical Approach..... 44
 - 2.4 Explanatory Variables..... 50
 - 2.5 Methodology..... 53
 - 2.6 Results and Discussion 55
 - 2.7 Conclusion 61

3 Transnational Diaspora Entrepreneurship: A rare event measurable with new GEM data	65
3.1 Introduction	67
3.2 Impact and Relevance.....	69
3.3 Methodology.....	71
3.4 Data collection.....	79
3.5 Results and Discussion	81
3.6 Conclusion	83
4 Transnational Entrepreneurs: Opportunity or Necessity driven?	84
4.1 Introduction	86
4.2 Comparing national entrepreneurial Contexts: Chile and Germany.....	88
4.3 Theoretical Framework.....	90
4.3.1 Transnational Entrepreneurship	90
4.3.2 Entrepreneurship Motivations.....	92
4.3.3 Transnational Entrepreneurship, Motivations and Opportunity	93
4.4 Data, Methodology and Results	95
4.4.1 Data and Methodology	95
4.4.2 Results.....	96
4.4.3 Traits of transnational Entrepreneurs: Country Comparison	104
4.5 Discussion: Parallels and Differences	106
4.6 Conclusions	108
5 Measuring entrepreneurial ecosystems at regional level	111
5.1 Introduction: Entrepreneurial Eco-Systems and the Relevance of empirical Evidence	113
5.2 The concept of Entrepreneurial Eco-Systems: State of research and challenges for (future) research.....	115
5.3 Erik Stam's Concept and Operationalisation of Entrepreneurial Eco-Systems.....	121
5.4 Measuring an Entrepreneurial Eco-System: a Proposal.....	123
5.4.1. Basics	123
5.4.2 Assessing the Core EES Conditions	127
5.4.3 Indexing: an Opportunity to compare EES over Time and across EESs.....	130
5.4.4 Comparing EES over Time and to each other	133
5.4.5 Assessing the systemic Character of an EES.....	133
5.5 Conclusions and future Research.....	134

6 The Road to Evidence based applicable Policies for regional Entrepreneurial Ecosystems.....	137
6.1. Introduction	139
6.2. Approaches for empirical EES Data.....	141
6.3. The Region of Hanover as a Test Field: Entrepreneurial Activity.....	143
6.4. Method and Data	145
6.4.1 Entrepreneurial ecosystem composite index (ESI): Quantitative EES data	146
6.4.2 Stakeholder Interviews: Qualitative EES Data	147
6.5. Results.....	149
6.5.1 ESI Scores.....	149
6.5.2 Stakeholder Interview Outcome	151
6.6. Discussion and implications.....	160
6.7. Conclusion.....	164
7 Thesis Conclusion	166
7.1 Thesis Summary	166
7.2 Not just a Sum of its Parts.....	171
References.....	174
Appendix	197
Appendix A: Python script.....	197
Appendix B.1: GEM TDE: Excerpt of GEM APS questionnaire 2016	199
Appendix B.2: GEM TDE: Excerpt of GEM NES questionnaire 2016	200
Appendix C: Variable Description	201
Appendix D.1: GEM ESI: GEM EES APS Questionnaire	202
Appendix D.2: GEM ESI: GEM EES RES Questionnaire	206
Appendix E: Code System Interview Data	208
Co-Author Agreements	209
Short Curriculum Vitae.....	218

List of Figures

Figure 2.1:	The relationship between media Coverage and entrepreneurial activities....	37
Figure 2.2:	Map of news distribution.....	47
Figure 2.3:	Map of share of entrepreneurial news.....	49
Figure 2.4:	Map of share of respondents aware of entrepreneurial news.....	51
Figure 2.5:	Distribution of entrepreneurial news per region.....	54
Figure 3.1:	TDE APS skip logic summary.....	79
Figure 5.1:	Systemic relations of ecosystem conditions in Stam's EES model.....	121
Figure 5.2:	Relationships between regional framework conditions, entrepreneurial ecosystem and entrepreneurial activities.....	126

List of Tables

Table 1.1:	Thesis elements.....	22
Table 1.2:	GEM variable selection.....	27
Table 2.1:	Keyword frequencies.....	47
Table 2.2:	Regression results.....	59
Table 2.3:	Sentiment analysis.....	60
Table 3.1:	TDE share of TEA.....	82
Table 4.1:	Descriptive Statistics from Chile and Germany.....	96
Table 4.2:	Pooled Data Probit Model Regression.....	97
Table 4.3:	Chile Models Estimations.....	100
Table 4.4:	Germany Models Estimations.....	103
Table 4.5:	TE Traits Results.....	105
Table 5.1:	Questions to cover the EES condition "Culture".....	128
Table 5.2:	Questions to cover the EES condition "Talent".....	129
Table 5.3:	Questions to cover the EES condition "Leadership".....	130
Table 6.1:	General statistics for the Region of Hanover.....	143
Table 6.2:	RoH GEM variable development between 2012 and 2018.....	145
Table 6.3:	Interviews per stakeholder category.....	148
Table 6.4:	ESI Scores.....	149
Table 6.5:	EES strength and weaknesses as perceived by experts.....	150
Table 6.6:	EES strength and weaknesses as perceived by entrepreneurs.....	150

Abbreviations

APS	Adult Population Survey
B2B	Business to Business
B2C	Business to Customer
COO	Country of Origin
COR	Country of Residence
csQCA	crisp set Qualitative Comparative Analysis
CT	Culture
DM	Demand
dpa	Deutsch Presse Agentur (=German Press Agency)
e.g.	Exempli gratia (for example)
EDA	Economic Development Agency
EECI	Entrepreneurial Ecosystem Composite Index
EES	Entrepreneurial Ecosystem
ESI	see EECI
et al.	Et alii (and others)
FI	Formal Institutions
FN	Finance
fsQCA	fuzzy set Qualitative Comparative Analysis
GEM	Global Entrepreneurship Monitor
KW	Knowledge
LD	Leadership
LUH	Leibniz University Hannover
NES	National Expert Survey
NT	Networks
OM	Owner-Manager
PCA	Principal Component Analysis
PI	Physical Infrastructure
QCA	Qualitative Comparative Analysis
RES	Regional Expert Survey
RIAC	Research and Innovation Advisory Sub-Committee
RoH	Region of Hanover
SEC	Stam Ecosystem Condition
SME	Small and Medium size Enterprises
SU	Start-Up
SV	Support Services and Intermediaries
TDE	Transnational Diaspora Entrepreneurship
TE	Transnational Entrepreneurship
TEA	Total early-stage Entrepreneurial Activity
TL	Talent

1 Introduction

1.1 Entrepreneurship and Economic Geography

The relationship between entrepreneurship and space is an interdependent one. Entrepreneurial activity in any given territory is an inherently economic geographical process. The interdependent nature is rooted in the circular and cumulative causality where space and its conditions and factor compositions influence entrepreneurial activity, which in return affects the space in which it occurs, transforming contribution, changing conditions and factors. The form, in which entrepreneurship occurs however, is manifold. Psychological (e.g. Frese and Gielnik 2014 or Begley and Boyd 1987) or sociological factors (e.g. Meek, Pacheco and York 2010), personal traits (e.g. Zhao and Seibert 2006), economic situation and unemployment (e.g. Kibler 2013 or Ritsilä and Tervo 2002) amongst others can play a role. Effects on, for example start-up motivation, growth aspiration, economic effect, employment, degree of innovation or chance of survival, are therefore not mono-causal. Place is by no means the singular influence, but an important one amongst others. Entrepreneurship is a vastly multidisciplinary research area in various forms and aspects, opening up the necessity of interdisciplinary approaches to overcome the “blind-scientists-describing-the-elephant” problem (see e.g. Ireland and Webb 2007).

Measuring the various entrepreneurial phenomena is a key element to understanding not only that single phenomenon but to advance entrepreneurship research at large. This thesis aims to contribute insight into capturing empirically undercovered entrepreneurship phenomena combining three entrepreneurship research areas, which are linked by method, processes and the factor space. The close connection between entrepreneurship and its various forms with geography in terms of space or place based peculiarities and effects, e.g. through (spatial) proximity, shows that the research fields entrepreneurship and economic geography are tightly interwoven.

The strong interdependent relationship between spatial (economic) factors or conditions and entrepreneurial activity gave rise to a systemic view on relationship where processes and actors are interconnected: Entrepreneurial Ecosystems (EES). EES is a prime example of the space dependent nature of entrepreneurship. Especially in the last decade, fanned by work of Feld (2012) and Isenberg (2011), the systemic approach to entrepreneurship received heavy attention by researchers and policy makers, despite the fact that both authors are no experts in entrepreneurship research on a regional level or even economic geography. The EES construct

shows strong parallels with the spatial approach to innovation. Following a similar path from national to regional systems, EES literature developed a lot faster, as it draws much from already existing work on national and regional systems of innovation as well as innovative milieus. See Moulaert and Sekia (2003) for the development of spatial approaches to innovation. EES is one of the core elements of this thesis and section five delivers a deeper review on the EES literature and its genesis.

Since reviewing all the literature and spatial dimensions of entrepreneurship would be a thesis in itself, the following introduction to entrepreneurship and economic geography is a mere setting-the-scene and certainly makes no claim of being complete. The main focus of this thesis is on measuring entrepreneurship in various forms, contributing to a more complete empirical data body, advancing entrepreneurship research. Before I dive into the specific chapters based on papers however, as a preparation for the upcoming analyses and findings, the various effects and (inter-)dependencies that render entrepreneurship such an exciting research area within a spatial context are highlighted.

To understand the peculiar challenges which had to be coped with in this work, an elucidation of complexity is executed. To ease into this matter, causal directions are divided into the influence of spatial conditions onto entrepreneurial activity and vice versa. As starting point, the direction of influence that is exerted from place and space and their characteristics and composition onto (regional) entrepreneurial activity is receiving a closer look.

One of the more prominent factors space exerts on entrepreneurial activity is placing actors, organisations and institutions in proximity with each other. Increased proximity allows for easier network (and density) build up and event participation, face-to-face contacts and serendipitous encounters, knowledge spillover, easier accumulation of and access to human capital and creatives, providing a social context, allowing for regional identification, condensed production and faster diffusion of knowledge amongst many other factors (see e.g. Sternberg and Kraus 2014; Huggins and Thompson 2015; Weterings 2006; or Glaeser et al. 1992).

Proximity and actor density also connect to agglomeration theory. Both localisation and urbanisation factors seem to play important roles for regional entrepreneurial activity (Glaeser et al. 2010, Bosma and Sternberg 2014). Accumulation of a critical mass of entrepreneurs has a negative side as well, since entrepreneurs have to compete against each other for office space, funding, employees or consumers. On a positive note (for the region), this increases the overall fitness of the (surviving) business models. Urbanisation factors, as displayed by Bosma and

Sternberg (2014), seem to be in favour of opportunity driven entrepreneurial activity rather than necessity driven.

Spatial and sectoral concentration, i.e. clusters, can positively influence entrepreneurial activity through spin-off business foundations and emerge of sub-contractor manufacturers. However, clusters can also dampen entrepreneurial activity in sectors that are not dominant in the region. Furthermore, clusters can be the result of entrepreneurship as well, which is why they are revisited in the next section. See Rocha (2004) on clusters and entrepreneurship.

The regional knowledge spillover theory of entrepreneurship is another milestone in entrepreneurship research. Although increased spill-overs have been mentioned as an outcome of proximity, their value for regional development earns an additional focus. Acs et al. (2009) as well as Audretsch and Aldridge (2009) progressed this concept note worthily as they found it to be one major source for opportunities, which can be exploited by entrepreneurs for business start-ups. A more recent take on this topic comes from Stuetzer et al. (2018) or Li et al. (2016).

The regional conditions also influence the new businesses survival rates (see e.g. Huggins, Prokop and Thompson 2017, Acs et al. 2008 or Falck 2007). For example, the existence of large established businesses with a considerable market share or a lack of regionally available funding can decrease the chances of new business survival (Santarelli and Vivarelli 2007).

Furthermore, the regional demographic structure can influence the quantity of entrepreneurial activity. Population size and density, as well as their changes, seem to affect (regional) entrepreneurial activity as well. Entrepreneurship may even be a coping mechanism for both increase and decrease of population density: Delfmann et al. (2014) were able to show an increase of entrepreneurial activity in rural areas following a population density decrease. In contrast, technological progress (i.e. innovation), often driven by ingenious entrepreneurs, is one outcome of an increase of population and population density (e.g. Harhoff 2008).

Following the seedbed hypothesis, the „home“ region of an entrepreneur may play a relevant role, not only in the decision to start a new business but also where to start and where to grow it (Dahl and Sorenson 2009). Dahl and Sorenson (2012) also find evidence on home region affecting survival rates. However, spatial inertia is only characteristic for some forms of entrepreneurship.

Another well-accepted theoretic approach is the incubator thesis, stating that foremost high-tech entrepreneurship is fostered by established regional firms and higher education institutions, producing knowledge spillover and spin-offs. The quality of these incubators is supposedly

directly affecting quantity and quality of new business foundations within the region (Egeln et al. 2004; Feldman 2001). Higher education institutions undoubtedly play a major role in high tech business foundations. Not only through knowledge creation but also through their support structures (e.g. Vorderwuelbecke 2015; Nathusius 2013)

Many context conditions, specific to an individual region can influence the extent to which entrepreneurship occurs. While context in general does not necessarily refer to the spatial surroundings but also non-spatial forms of context (see Welter 2011). The influences of these contexts, both spatial and non-spatial, are bundled in the entrepreneurial ecosystem approach. Stam (2015) summed up the more important ecosystem elements, divided into system and framework conditions, which influence entrepreneurial activity, and value creation, which in return influences the elements, thus completing the cycle. Because the EES approach receives special attention in chapter five and some areas have already been covered, only a selection of influences and processes is displayed here.

Commonly the leadership position in an EES is attributed towards entrepreneurs or teams of entrepreneurs (see Feld 2012). As chapter six will show, in some country contexts, leadership can be attributed towards public organisations as well. This is not necessarily towards the systems advantage. The state of regionally available sources for financing covers another important EES condition. Different forms of entrepreneurship require different forms of funding. BAs, VC, debt capital, state covered security (bonds) etc.: The availability of funding, if needed, and cost of it through interest rates directly affects new firm formation (Parker 2009).

Institutions play a role in facilitating or hindering entrepreneurial activity (see e.g. Autio and Fu 2015 or Fritsch and Storey 2014). An overload with bureaucratic steps complicating and elongating the founding process can reduce pro-founding decision-making or push potential entrepreneurs into other, lesser-regulated regions, thus weakening the regional endogenous growth through loss of human capital and potential employers or innovators. However, for high-invest new ventures, a stable and reliable ruleset, such as a sound legal infrastructure, is a facilitating environment, as investments are less likely to end in failure of monetisation (Venkataraman 2004). There seems to be a sweet spot regarding the degree of regulation (see e.g. Van Stel, Storey and Thurik 2007). The same goes for the influence of culture and informal institutions. While a more risk adverse cultural background, where failure is seen as stigma and entrepreneurial success is connoted with exploitation is hindering entrepreneurial activity, a context of risk rewarding, get-up-and-try-again mentality with high regards to entrepreneurs'

impact on society and economic growth is a lot more conducive (e.g. Bosma and Schutjens 2011 or Wyrwich, Stuetzer and Sternberg 2016) .

The role support services play for regional entrepreneurial activity can differ vastly, especially in different national contexts. While some cultural backgrounds produce a more “hands-off” approach and public organisations merely provide a legal framework, in other contexts, such as Germany, public organisations play a much more active role (von Bloh 2021).

Physical Infrastructure can matter for EES as well. Not only availability of office space and internet connection speed (and costs) plays a role. Traffic infrastructure can allow for easier access to other EES, if condition quality, e.g. availability of VC, lacks behind. This can lead to entrepreneurs not having to leave their “home EES” despite suboptimal conditions. This however, puts both EES into a more competitive state. While this can be suffocating for one EES if the differences are to stark, it can also be a vitalising or even complementing factor for both EES.

Although regional conditions affect entrepreneurial activity immensely, also national (framework) conditions factor into the equation. For example, start-up motivation can be affected by the economic state of a nation in quantity and quality. Amorós et al. (2019) were able to show the influence of state fragility on necessity and opportunity entrepreneurship: Less stable economic conditions lead to an increase of necessity driven entrepreneurship. Overall development, resource richness, national growth strategy, health care and more importantly welfare system as a safety net impact the way entrepreneurship is practised.

Since space and its conditions do not only exert unidirectional influence on entrepreneurial activity, now, after shining light on the direction of influence from spatial conditions onto (regional) entrepreneurial activity, the inverted causal direction is now highlighted. The influence of (regional) entrepreneurial activity on conditions and characteristics of space and place.

The amount and shape of (regional) entrepreneurial activity or the lack thereof also shapes the spatial conditions in return in multiple ways and magnitudes, ranging from Schumpeterian creative destruction by means of radical inventions and innovations to simply providing a livelihood, thereby releasing pressure on public aid structures. By now, the role of entrepreneurship for (regional) economic development is undisputed (e.g. Malecki 1997; Müller 2016), despite not playing a role in established growth theories for a longer period (such

as Romer 1986). As multifaceted as entrepreneurship is are its effects. Entrepreneurial activity is a fundamental factor contributing to an underlying perpetual renewal of economic and sectoral structures and compositions. The majority of effects induced by entrepreneurial activity was found to be positive (e.g. Fritsch 2013): Entrepreneurial activity can act as one part of the endogenous growth engine of regions. Reducing unemployment by self-employment but also job creation and new firm growth. A growing firm population increases the inflow of tax payments, funding public institutions, and infrastructure or welfare possibilities thus increasing the standard of living within such regions (see e.g. van Praag and Versloot 2007). A broader base of firms, especially if diverse, helps reducing economic risks through exogenous shocks like a major national economic downturn, thus regional vulnerability is lowered (Martin 2012).

Job creation and tax inflow however, are not the only positive effects. Perhaps more importantly, entrepreneurial activity positively affects the regional potential for innovation (e.g. Etzkowitz and Klofsten 2005). Inducing innovations can emerge by at least three different factors: Incessant renewal of the economic structure, pressure to innovate on incumbent firms and disruptive new inventions brought to market. Overall, new firms seem to have positive impacts on regional systems of innovation (see Sternberg 2007; Koschatzky 2001). Moreover, entrepreneurial activity can act as a refining filter for the regional knowledge base by being more prone to start (and thus establish) knowledge that can be economically exploited, thus accelerating diffusion of this particular knowledge. Foundations with less exploitable knowledge might have a higher chance of failure, leading to elimination of such knowledge by evolution (Audretsch and Keilbach 2004a).

Another relevant effect entrepreneurs can induce is the connection of regions and the entrepreneurial ecosystems of those regions – not only intra-nationally but also internationally. Through circular migration, entrepreneurs, or if migrating between countries, transnational entrepreneurs, can act as “*bridging agents*” establishing flow and exchange of knowledge as well as routines and norms (e.g. Riddle, Hrivnak and Nielsen 2010). While an initial emigration was long seen as brain drain from a country of origin to a brain gain in a country of residence, Saxenian (2006, 2008) corrected parts of this view towards the term brain circulation – stating a beneficial effect to both ends of the migration corridor.

It is worth mentioning, that regarding the interdependent relationship and effects of entrepreneurial activity on regional growth, and thus the need of supporting and fostering it, there are two major lines of view, differentiating between high potential entrepreneurial activity (“start-ups”) and the more mundane new firm formations (i.e. hair dressers, take out restaurants,

tax attorneys, etc.). Shane (2009) follows the narrative, that not all forms of entrepreneurial activity have positive effects on the regional economy but only those that are innovative, have high growth potential or are high-tech based. Thereby, resources used to foster non-high-potential entrepreneurial activity, are seen as wasted. Morris, Neumeier and Kuratko (2015) challenge this, as they see also cumulative positive effects over all non-high-potential businesses.

1.2 Measuring Entrepreneurship: The Challenges

The previous chapter linked entrepreneurship with economic geography, listing a multitude of factors, dependencies and interdependencies. Amongst other factors, these pose numerous challenges for measuring entrepreneurship of which a selection will be addressed here. For a meta study on the challenges of space related entrepreneurship research see Trettin and Welter (2011).

Whether someone decides to start a new business is not an isolated objective decision. It can be influenced by education and experience, by personal but influenceable traits such as fear of failure or perception of skill and actual skill. Having entrepreneurial role models or lacking them plays a role (e.g. Wyrwich, Stuetzer and Sternberg 2016). The socio-economic as well as spatial context in which the person operates also comes into play, as displayed in the previous chapter (e.g. Hindle 2010 or Acs, Autio and Szerb 2014 for the role of context).

Visibility of regional success stories, e.g. via media, can play a role as well. See chapter two for an approach on media coverage and entrepreneurship. The context conditions influencing entrepreneurial activity are bundled into the EES approach which receives a close look in chapters five and six.

The motivation for starting a business can also vary drastically, ranging from simplest necessity over seizing opportunities up to altruistic social entrepreneurship. These are but some factors influencing individual start-up decisions which illustrate the complex causality one has to tackle when the seemingly simple question is asked: Why did that person found a business in that region?

Furthermore, not only the personal decision making process challenges the capture of entrepreneurial activity. Overall, the heterogeneous target group of “entrepreneurs” varies vastly. Some founders differ in their requirements strongly from the “average” male

entrepreneur with experience, and access to funding in his thirties. See e.g. May (2013) for a study on female migrant entrepreneurs in the city of Hanover. Additionally, some subforms of entrepreneurship are practiced in very secretive enclosed groups, such as the diamond trade, but can have high impacts like cluster genesis (see Henn 2013). Another example would be the highly mobile transnational entrepreneurs who are active in at least one host country (maybe even primarily engaged with their diaspora) but also their home country, travelling back and forth (e.g. Saxenian 2006; Sequira, Carr and Rasheed 2009). The latter target group is subject to chapters three and four.

The business models of entrepreneurs also vary from self-sustaining (i.e. livelihood coverage) to highly innovative, fast growing businesses with ambition for internationalisation both forms leave quite different imprints on their economic contribution to growth, if seen as single unit (e.g. Shane 2009 or Morris, Neumeyer and Kuratko 2015).

Founding a new business occurs not at a specific point in time but is a process over a period of time. After the decision has been made and an idea exists, one has to plan, prepare and research, collect funding, learn about pitfalls and competition, refine the business model and so on. After funding and founding, other challenges arise, and many young businesses fail in their early years (e.g. Parker 2009). This poses additional challenges for empirical approaches as this processual nature has to be regarded and the dynamic of market entries and exits should be reflected as well.

The interdependency between (regional) entrepreneurial activity and (regional) economic state and development poses not only chicken and egg problems but becomes a decisive factor for policy interventions aimed at fostering entrepreneurship (Audretsch and Keilbach 2004b). Similar to policy approaches for regional innovation, there is no “*one size fits all*” approach to collect empirical data on the multitude of entrepreneurial processes (Toedtling and Trippel 2005). It needs phenomenon specific tools and bespoke surveys to research, understand and ultimately foster said phenomenon. National or regional entrepreneurial activity is quite slow to influence, as it can take years if not decades before noticeable changes occur. The cyclic interdependencies call for changes to be applied along multiple specific points of the loop, e.g. sensitization of the population or teacher education. The cyclic nature however, complicates the identification of the best pivotal points to increase (regional) entrepreneurial activity.

The above listed challenges lead to methodological problems such as endogeneity, unobserved heterogeneity, or selection bias, amongst others (e.g. Parker 2009). Especially endogeneity is

troublesome as it can render the workhorse of quantitative statistical analysis, the (OLS) regression, hard to interpret or even useless, calling for more sophisticated approaches (such as multi-level analysis, see Hundt 2012 or Bosma 2009) or heavy use of control variables. High data quality can remedy some of these problems. To contribute towards this, chapter two addresses the issue of different methods capturing entrepreneurship and explores an alternative measurement using Big Data.

1.3 The Structure of this Thesis

1.3.1 Composing Elements

The papers compiling this cumulative dissertation connect with each other in ways of overlapping and intersection, succession and complementation. While the main theme is measuring entrepreneurial phenomena and their interaction with space, different sides, target groups and spatial scales of entrepreneurship are approached to build a more complete picture. Table 1.1 shows the papers that build the core of this thesis and their current state in April 2021. In total, this thesis is built from four journal papers – published or accepted by international peer reviewed journals – and one book chapter - based on my master thesis and currently under review for the Edward Elgar Handbook of Transnational Diaspora Entrepreneurship.

While paper four and the book chapter were solely constructed and written by me, three of the papers include contributions by co-authors. Since those papers contain work from other authors, a transparent listing of my contributions becomes a necessity and is therefore provided for these three publications. The following section will focus on attributing the scientific contributions. Editing, proof reading and revising were mainly my work with the exception of paper three, which was edited and submitted by Rolf Sternberg.

Table 1.1: Thesis elements

Chapter/Title	Author(s)	Status	Journal / Book	Data
Chapter two is based on: New(s) data for Entrepreneurship Research? An innovative Approach to use Big Data on Media Coverage (Paper one)	von Bloh, J. Oezgun, B. Broekel, T. Sternberg, R.	published print 2020 online 2019	<i>Small Business Economics</i>	DPA press releases GEM 2012-2019
Chapter three is based on: Quantitative Measurement of a rare Event: Transnational Diaspora Entrepreneurship Data through GEM Methodology	von Bloh, J.	submitted 2019 under review	Edward Elgar Handbook of Transnational Diaspora Entrepreneurship	GEM TDE 2016
Chapter four is based on: Transnational Entrepreneurs: Opportunity or Necessity driven? Empirical Evidence from two dynamic Economies from Latin America and Europe (Paper two)	von Bloh, J. Mandakovic, V. Apablaza, M. Amorós, J.E. Sternberg, R.	published print 2020 online 2019	<i>Journal for Business and Migration Studies</i>	GEM TDE 2016- 2017
Chapter five is based on: A new framework to measure Entrepreneurial Ecosystems at the regional Level (Paper three)	Sternberg, R. von Bloh, J. Coduras, A.	published print 2019 online 2019	<i>Zeitschrift für Wirtschaftsgeographie</i>	GEM ESI 2018
Chapter six is based on: The Road to Evidence based applicable Policies for regional Entrepreneurial Ecosystems (Paper four)	von Bloh, J.	published online 2021	<i>Journal of Entrepreneurship and Public Policy</i>	Interviews 2017-2019 GEM ESI 2018 GEM 2012

Paper one with co-authors, “*New(s) data for Entrepreneurship Research? An innovative Approach to use Big Data on Media Coverage*”, was co-authored by Burcu Oezgun, Tom Broekel and Rolf Sternberg. Burcu Oezgun contributed to data processing, analysis (R-script) and most figures. Tom Broekel contributed to data analysis and wrote parts of the methodology and results chapter. Rolf Sternberg wrote the main part of the introduction and created figure 2.1. The programming and application of the API scraper for the DPA data as well as data processing (GEM data) was done by me. The state of literature on measuring entrepreneurship, the integration of the paper into the big data framework, the relationship between media (coverage) and entrepreneurship, data and variable description, parts of the introduction and methodology, most parts of results and discussions, as well as the conclusion have been written by me. Led by me, Tom Broekel and Rolf Sternberg contributed to the conceptualization of the paper.

The second paper with co-authors, *“Transnational Entrepreneurs: Opportunity or Necessity driven? Empirical Evidence from two dynamic Economies from Latin America and Europe”*, was co-authored by Vesna Madakovic, Mauricio Apablaza, José Ernesto Amorós and Rolf Sternberg. Vesna Madakovic contributed to the comparison of the national entrepreneurial contexts as well as data analysis. Mauricio Apablaza contributed most of the calculations, data analysis and tables. José Ernesto Amorós wrote parts of the chapter about transnational entrepreneurship and the section on entrepreneurial motivations. Rolf Sternberg contributed parts of the introduction as well as minor additions to multiple chapters. Most of the introduction, part of the national context comparison, part of “Data, Methodology and Results”, most of the theoretical framework, the discussion of results and parts of the conclusion were written by me. I contributed heavily to the conceptualisation of the TDE data collection for GEM as well as the data collection itself. The conceptualisation of this paper was a joint effort.

Paper three with co-authors, *“A new framework to measure entrepreneurial ecosystems at the regional level”*, is the only one listing another person as main author: Rolf Sternberg. Co-authors are Alicia Coduras and I. Rolf Sternberg wrote most of the introduction and conclusion as well as chapter four “Measuring an Entrepreneurial Eco-System: a proposal”. Alicia Coduras contributed through comments and the underlying ESI concept and report. Alongside some minor additions to other chapters, I wrote the chapter “The concept of Entrepreneurial Eco-Systems: State of research and challenges for (future) research” and “Erik Stam’s concept and operationalisation of Entrepreneurial Eco-Systems”, thus contributing a large share to the overall paper. Despite not being main-authored by me, this paper is still used in the dissertation. Firstly because many parts are based heavily on the GEM ESI pilot report which was mainly written by me and Alicia Coduras, who did the calculations and index composition (see von Bloh, Coduras and Sternberg 2018). Secondly because it fits very well into the thesis’s narrative, being the knowledge basis for the integration of paper four.

1.3.2 Thesis Outline

The different intertwined elements of the thesis each focus on a specific part of entrepreneurship. The thesis consists of seven chapters, four of which are based on papers (three published, one accepted and forthcoming) and one being a book chapter currently under review. The introduction, chapter one, delivers the (theoretical) frame in which the following chapters are placed. A frame that is picked up and closed by the conclusion. It serves as methodological and

thematic starting point. The connection between entrepreneurship and economic geography is displayed and measurement of entrepreneurship with a spatial dimension is set as the purpose of this thesis. The introduction also shows the building blocks of this thesis by introducing the papers on which chapters two to six are based upon. Chapter two then explores alternative entrepreneurship measurements using a Big Data approach utilising DPA press release data and pooled GEM APS data from 2012-2019. The Big Data topic starts of the paper content part of the thesis by expanding the methodological possibilities. However, it also shows that new takes on “classical” survey designs are not obsolete. A point well remembered in the upcoming TDE and EES chapters. Chapters three and four are bound by succession as well as chapters five and six. While the second chapter shows new ways to explore for data collection, the remaining chapters show, in progressing complexity, what kind of data can be achieved by special tailoring a proven methodology towards a phenomenon. Chapter three displays the measurement approach to comparable Transnational Diaspora Entrepreneurship data on national level using GEM APS and NES questionnaires. This covers the conceptualisation of a methodological approach to a rare entrepreneurial phenomenon. This chapter serves as a methodological introduction for TDE, which is required in the next one. Chapter four then uses the data outcome of the work described in chapter three and analyses and compares transnational diaspora and transnational entrepreneurship activity for two national contexts. Furthermore, using the GEM TDE data for research results into deeper insight into the quality of the collected datasets, thus displaying the application and potential for refinement of the concept introduced in the previous chapter. In chapter five, the national and global focus of the previous chapters is reduced explicitly towards the regional, i.e. sub-national scale turning towards the systemic approach to entrepreneurship. As argued before, the spatial scale of choice for EES is the region. Displaying a new framework to create EES data with inter-EES comparability allows not only for ranking of EES regions but also of EES condition qualities such as Networks, Financing or Leadership amongst others. The introduced Entrepreneurial Ecosystem Composite Index (ESI) is described in detail. This lays part of the foundation for chapter six, which uses ESI data supplemented by qualitative regional EES stakeholder interviews to build a solid empirical foundation for applicable policy implications and instruments. Chapter seven concludes by first summarising the approaches and results of all previous chapters and then drawing the overarching findings from combining the papers.

1.4 Data

1.4.1 The Global Entrepreneurship Monitor (GEM)

As the main focus of this thesis is on measuring entrepreneurship, data plays a major role. This section briefly introduced the used data, a more detailed description follows in the respective chapters. The common denominator between all chapters is the Global Entrepreneurship Monitor (GEM). Some sort of GEM data is used in every paper that was incorporated into this thesis. Due to the importance of GEM to this work, a short introduction into GEM methodology is necessary to get a good grasp of the methodological environment in which the new frameworks have been embedded. However, as there was particular interest in entrepreneurial phenomena that are not sufficiently covered by empirical data, the standard GEM methodology was augmented to fit the specific research topic. These augmentations also are object of the chapters three to six.

This thesis benefits strongly from my profound knowledge of GEM and its methodology. I contributed vital inputs towards the transnational diaspora entrepreneurship project and especially to the development of the new entrepreneurial ecosystem index. During my time as data contact of the German GEM team, I co-managed data collection from 2015 to 2019 and was active as co-author for the German national reports from 2015 to 2020.

The GEM is an international research consortium that provides high quality representative country level data to measure (national) entrepreneurial activity at different stages of the founding process (see www.gemconsortium.org). National is put in brackets, as there are and were some attempts of applying GEM methodology regionally as well (see e.g. Bosma 2009, Hundt 2012, or Wagner and Sternberg 2004). Since the first data collection in 1999, GEM has grown a respectable database for entrepreneurship in both quality and size. Over the span of the last 20 years, far more than 100 different countries worldwide participated in data collection with at least 50 different countries each year. Participating countries always have been a healthy mix from around the globe, spanning country-development stages from highly developed and innovation driven to agriculture dominated developing countries.

GEM is able to depict the processual nature of the founding process through capturing multiple stages of it, such as no intention to start a business at all, having thought about it, pre-founding (i.e. nascent) entrepreneurs actively involved in a start-up effort, recently started baby or young

businesses or even established entrepreneurs managing and owning a business over the age of 42 months.

The two major data collection tools of GEM are the Adult Population Survey (APS) and the National Expert Survey (NES):

The APS measures entrepreneurial activity (from the nascent entrepreneur in pre-founding stage up to established owner-manager), population disposition towards entrepreneurship, self-perceived skill levels for business foundations, fear of failure and intrapreneurship amongst many other variables. In most countries, the APS is conducted via telephone interviews, either mobile or fixed line or a combination of both with some sort of randomisation. The sample has to represent the country's population throughout the distribution of gender, age and education amongst others. Weights can be applied to achieve this, however within a reasonable limit. A minimum of 2.000 cases per country and data collection cycle (year) is required to participate. German sample size exceeded this amount in almost all years by at least 50%, ranging from 3.004 in 2019 to 15.000 in 2001.

The NES measures national Entrepreneurial Framework Conditions (EFC) by surveying experts. Framework Conditions are divided into nine EFCs, such as Financing, Governmental policies, Education and training or internal market openness amongst others. Each EFC has to be covered by at least four experts. In Germany, the NES has been conducted online in the recent years with more than 50 cases each year, thus exceeding the required minimum easily.

Table 1.2 shows a very limited overview of a fraction of GEM APS variables. Over the time, some variables were added and some discontinued. Showing all currently used variables (as of 2019) would be a list of almost 300 variables for the adult population index alone. The depth and differentiation the GEM APS data set is able to depict is unmatched in entrepreneurship research. Global reports as well as special topic reports and older data sets including their variables can be downloaded from www.gemconsortium.org.

Table 1.2: GEM variable selection (Source: GEM APS dataset for Germany 2019)

GEM variable	Description
TEA19	Involved in Total early-stage Entrepreneurial Activity
TEA19MAL	Involved in TEA, male
TEA19FEM	Involved in TEA, female
SUB	Reports new start-up effort (independent or job)
SUBOANW	Actively involved in start-up effort, owner, no wages yet
BABYBUSO	Manages and owns a business that is up to 42 months old
ESTBBUSO	Manages and owns a business that is older than 42 months
FUTSUP19	Expects to start-up in the next 3 years
DISCEN19	Discontinued a business in the past 12 months, business was NOT continued
BAFUNDUS	Informal funds in the last 3 years value - US\$
BUSANGVL	Informal investor in the last 3 years with provided value
KNOWEN19	How many people do you know personally who have started a business or become self-employed in the past 2 years?
OPPORT19	Sees good opportunities for starting a business in the next 6 months, agree/disagree
SUSKIL19	Has the knowledge, skill and experience required to start a new business, agree/disagree
EASYST19	In your country, it is easy to start a business, agree/disagree
FRFAIL19	Would not start a business for fear it might fail, agree/other

GEM data quality is assured due to the data team reviewing each data set and supplying extensive feedback and optimisation potential to the national teams. Before any country can collect APS data, the countries vendor proposal has to be authorised by the data team as well. The NES data quality is supervised through the data team as well. GEM data is widely used by academia and policy makers as it allows for comparison and ranking nations (within their specific development stage). For many countries, time series exist over multiple years. German GEM data exists from 1999 to 2020 with the only exception of 2007.

1.4.2 Further Data Sets used in this Thesis and my Involvement

The data used in this thesis is mainly quantitative survey data with the exception being chapter two, which uses a data set built from press releases and secondary statistics as control variables (alongside pooled survey data) and chapter six using additional qualitative interview data. All data collection and conception of data collection methods used in this thesis were (at least partly) created with my assistance.

Scraper: The DPA press release data used in chapter two was scraped by me using the DPA API and a Python script I programmed. The code downloaded the press releases as *.xml files which then have been processed further by one of the co-authors. See appendix A.

TDE APS and TDE NES: Chapter three shows the construction of the GEM TDE variables for both APS and NES, which were built upon my master thesis as part of the research project DiasporaLink. As part of the German GEM team, with data collection as my main role within the team, I managed the APS conduction from 2015 to 2019 and the NES was my responsibility from 2015 to 2017 as well. Thus, I closely conducted the TDE data collection in 2016 and 2017 and the EES APS data collection in 2018. See appendix B.

EES APS & EES RES: In the GEM ecosystem measurement approach that resulted in Sternberg, von Bloh and Coduras (2018 and 2019), von Bloh, Coduras and Sternberg (2018), and von Bloh (forthcoming) I was part of the core team. I also played a central part in building the theoretical foundation, GEM framework integration, conceptualisation, variable creation, wording and refinement as well as piloting of the methodology. The Global Entrepreneurship Research Association contributed the majority of the funds to pilot the ESI methodology. The ESI data used in this thesis has been collected during this pilot.

EES stakeholder interviews: The sixth chapter also uses ESI data from GEM that is supplemented, controlled and explained in a mixed methods approach by 35 EES stakeholder interviews I conducted in the Region of Hanover between 2017 and 2019. I did the interview design, conduction, processing, coding and analysing, with the exception of a research assistant who helped with transcription of the audio files. See appendix E. I want to thank Lower Saxony's ministry for science and culture for funding the research project, which made these interviews possible.

1.5 Contribution

This thesis contributes to entrepreneurial research not only through the single findings of the papers but also through their combined outcome as concluded in chapter seven. Entrepreneurship has been intensely researched and discussed in the last decades, often leaving the impression that only potential for infinitesimal steps forward is left. What is neglected in this verdict is that entrepreneurship is closely interconnected with how the world changes through globalisation and regionalisation. This is by no means a new finding (e.g. Zahra and George 2008; Sternberg 2009). Nevertheless, it is one, which brings along the following important aspect: As entrepreneurship adapts to these changes and develops as a phenomenon and research field, new uncovered aspects and research gaps arise. Such as transnational diaspora entrepreneurship, which could only develop in this form and relevance through globalisation as it depends on cheapening travel costs, increased possibilities to communicate over distance, openness to migration and so on (see e.g. Nkongolo-Bakenda and Chrysostome 2013 or Riddle, Hrivnak and Nielsen 2010). The increased mobility, heterogeneity and rareness of this target group are but three challenges that research has to overcome to understand this new phenomenon. As a contribution to the body of empirical data of topic, a start was made through chapters three and four in this thesis. A key to understanding such newly arisen research topics is empirical data. Data, that is collected in a way that the peculiarities of these new phenomena can actually show and are not clouded by unfit “established” fits-all-methods.

Another driver for the creation of new research gaps is technological progress, the amount of data that nowadays can be collected and analysed justifies new approaches and creates possibilities to challenge established findings or old hypotheses that can only be proven or falsified through Big Data (see e.g. Kitchin and McArdle (2016 on the potential of Big Data)). Using the example of media coverage, chapter two explores a big data approach as alternative measurement for entrepreneurship. Although the approach has to be refined the paper shows promising possibilities new data sources can offer to tackle old, new and emerging questions of entrepreneurial activity embedded in spatial or other contexts.

With the third focus of this thesis, the systemic approach, novelty is not necessarily a viable argument. Although EES gained quite the momentum in the second half of the last decade, viewing economic processes as a system is not new. For example, the EES approach bares strong parallels to innovation systems or innovative milieus (see e.g. Moulaert and Sekia 2003 for an excellent figure on territorial inclined innovation research). Nevertheless, there is a

surprisingly large gap when it comes to empirical data of EES, especially on sub-national levels. As with clusters (e.g. Porter 1998) or the creative class (Florida 2002), the - erratic - field application of the EES concept was much faster than researchers could provide a stable empirical basis. Especially since EES are depending on spatial proximity of the stakeholder or actors, a regional approach was needed to reliably create usable data for EES analysis and improvement through policies. The empirical gap is partly due to the high dynamic and complexity of EES. A problem that is addressed in chapters five and six of this thesis through a newly developed data set using special tailored surveys and qualitative interviews. Furthermore, this thesis contributes towards a methodology that helps to uncover shortcomings in entrepreneurial ecosystem as an entry point for region-specific policy implications. To understand and change ecosystems empirical data is needed (Vogel 2013). As Brown and Mason (2017:12) put it: “[...] *entrepreneurial ecosystems [...] require bespoke policy interventions.*” The findings of chapter six in this thesis support this statement and contribute to the data body and understanding of EES and produce such policy implications.

Through the tremendous multidisciplinary of entrepreneurship, each presumably small research gap opens up multiple others. In short, this thesis opens up new methods to measure entrepreneurship through Big Data, closes gaps on empirical data of specific entrepreneurial phenomena, and deepens the understanding of Transnational Diaspora Entrepreneurship as well as regional entrepreneurial ecosystems and their potential shortcomings. In addition, by doing so, the thesis opens up potential avenues for further research with this new data. New findings or research questions can be, to name but a few examples, reviewed from a business perspective, a psychological, a spatial, a sociological, a network perspective, in depth or with a broader approach, in conjunction with other questions like “how does this effect endogenous regional growth” or “can this reduce mortality of new firms, reduce liability of ...” and so on. Which leads to the argument that although entrepreneurship is heavily researched and a vast amount of quantitative, qualitative data exists (both “good” and “bad”), there is still much to learn. With new approaches and focus on phenomena that have not been sufficiently empirically covered, especially not on the regional level, this thesis addresses and closes multiple research gaps and contributes to the understanding on how such gaps can be further closed in the future.

2 New(s) data for Entrepreneurship Research?

This Chapter is based on:

von Bloh, J., Oezgun, B., Broekel, T., Sternberg, R. 2020. New(s) data for Entrepreneurship Research? An innovative approach to use Big Data on media coverage. *Small Business Economics* 55(3): 673-694. DOI: 10.1007/s11187-019-00209-x.

Related appendix: A

Abstract

Although conventional register and survey data on entrepreneurship have enabled remarkable insights into the phenomenon, the added value has slowed down noticeably over the last decade. There is a need for fresh approaches utilising modern data sources such as Big Data. Until now, it has been quite unknown whether Big Data actually embodies valuable contributions for entrepreneurship research and where it can perform better or worse than conventional approaches. To contribute towards the exploration of Big Data in entrepreneurship research, we use a newly developed dataset based on publications of the German Press Agency (dpa) to explore the relationship between news coverage of entrepreneurship and regional entrepreneurial activity. Furthermore, we apply sentiment analysis to investigate the impact on sentiment of entrepreneurial press releases. Our results show mixed outcomes regarding the relationship between reporting of entrepreneurial events, i.e., media coverage, and entrepreneurial activity in German planning regions. At this stage, our empirical results reject the idea of a strong relationship between actual entrepreneurial activities in regions and the intensity of it being reported. However, the results also imply much potential of Big Data approaches for further research with more sophisticated methodology approaches. Our paper provides an entry point into Big Data usage in entrepreneurship research and we suggest a number of relevant research opportunities based on our results.

Keywords

entrepreneurship, media coverage, mass media, Big Data, sentiment analysis, GEM, entrepreneurial ecosystem, region, news data

2.1 Introduction

New, vast amounts of data and data sources for scientific research have become available in recent years and seem to be ripe for the taking, i.e., to be analysed with sophisticated algorithms and Big Data approaches. Big Data is a reality, and it needs to be harvested for scientific purposes. This includes entrepreneurship research. Yet so far, relatively few efforts have been made in this direction. Most of the research in entrepreneurship still relies on insight from traditional data sources like registers and surveys. Investigating value and possibilities of all kinds of new and promising Big Data sources to unveil novel insights into entrepreneurship, however, seems to be the necessary next step. Although in the long run both traditional survey data and Big Data might complement each other and coexist, Big Data might be the crucial new approach to moving our research forward now. This paper makes such a contribution by analysing the relationship between entrepreneurship and news coverage in public media. Thereby, we are not only presenting an application of Big Data, but new data as well.

Until now, it is quite unknown whether Big Data actually embodies valuable contributions for entrepreneurship research and whether it can perform better or worse than conventional approaches. This issue has gained importance for several reasons. Empirical- (or evidence)-based research on entrepreneurship increased in relevance within the domain of entrepreneurship research in recent decades (see e.g. Audretsch 2012). Until now, the main source for quantitative data on entrepreneurship has been large-scale surveys or register-based approaches (see e.g. Coviello and Jones 2004). However, the former in particular requires significant investments of efforts and resources. Conducting statistically representative surveys, perhaps even with standardised questionnaires in different countries or sub-national regions and for a longer time period, is a challenging task that is not easy to fund and maintain. Consequently, searching for less expensive and easier methods to collect data on entrepreneurship is a major task to advance this field of research, especially in light of new methods, fast growing data sources, amounts and availability.

But cost and accessibility of data are not the only relevant motivations for exploring new sources. Although entrepreneurship research has gained much from exploiting quantitative survey and register data, many new findings seem to be small increments building on the existing knowledge base. A good indicator for the saturation of a specific field of research is whether a new or rather newly packaged concept such as entrepreneurial ecosystems is introduced and blows up. This field offered more or less the illusion of something completely

new. Publication statistics show that a huge amount of research effort was shifted towards this topic (Alvedalen and Boschma 2017). The measurement of entrepreneurship in its entirety needs to be revisited and modernised, as do its different components and influence factors. Due to digitalisation and internet-based platforms, Big Data allows for several new opportunities to create unique and specific databases in the near future.

This paper explores usage of news coverage for entrepreneurship research by examining the relationship of regional entrepreneurial activity with news and their sentiments using a Big Data set scraped from the web portal of the German Press Agency (dpa) subsidiary 'news aktuell'. The webpage has about 65,000 subscribers, mainly journalists and bloggers. Our aim is to explain the spatial pattern of entrepreneurship-related newsworthy events, based on more than 100,000 press releases scraped between May 2016 and November 2018 using access supplied by the dpa. The press releases have been explored regarding their statistical relationship with conventional indicators of entrepreneurial activities and media coverage. This particularly concerns information on entrepreneurship activities and the perception of entrepreneurship news coverage collected by the annual Adult Population Surveys (APS) as part of the Global Entrepreneurship Monitor (GEM). It leads to an interesting interpretation regarding the data quality of this particular, perception-based GEM variable. In addition, we analyse the entrepreneurship-related press releases with respect to regional differences in sentiments, i.e., if there are systematic variances in the way entrepreneurial activities are reported in press releases. Thus, our paper may be interpreted as a comparison of traditional, survey-based entrepreneurship data and Big Data.

Public media, even if reduced to news publications, show almost all of the related characteristics of Big Data. Following Kitichin and McArdle (2016), Big Data can show different sets and combinations of attributes or trait profiles. News data have a massive volume, even if only the number of articles is considered. But each article itself delivers a sub-level of additional information. Broken down into paragraphs, sentences, word combinations or just sheer word counts, the data multiply manifold. Filtering, matching or analysing this manually is impossible. Digital news data also have velocity. Different sites are competing for readers. News stories from yesterday are old and have lost their journalistic worth. Fast or even almost instant response time of news articles to real-world events has become the norm. Variety is a given as well. News data may be neutral reporting, of suggestive essayistic nature or ironically toned. They cover a huge variety of potential influences and topics aimed at different target groups

and varying political spectra. Even if different sites report the same event, articles may differ quite strongly. As such, news data show all 3Vs described by Laney (2001) and Kitchin and McArdle (2016). Furthermore, they show signs of indexicality (because each article is unique and has a known source, time and date), relationality (it can be matched with other data sources as shown in this paper), scalability (in close relationship to its velocity), veracity (in many cases, it is produced by humans who—especially in these large numbers—do not work flawlessly, and it is messy in terms of localisability, focus, quality and sourcing). News data are also valuable because they contain many layers of information (Mayer-Schonberger and Cukier 2013; Dodge and Kitchin 2015; Marz and Warren 2012; Marr 2014). For an ontological overview of these terms and a comparison between 'small' and Big Data types, see Kitchin and McArdle 2016.

To test the news data for entrepreneurship research usability, we explore the complex relationship between the factors influencing media attention and entrepreneurship in sub-national German regions on the one hand and the measurement of entrepreneurship activities on the other. Measurement of entrepreneurship activity in a region may use a wide variety of conventional or innovative data, both direct or indirect, either from survey or register-based sources. We argue that the potential of media data is large and almost completely unexploited. It delivers not only count data, but also text bodies with vast opportunities for research. Sentiment analysis is another new method we apply in our paper. Does positive/negative reporting influence entrepreneurial activities? Does this even differ systematically across space? If so, is it based on cultural differences venturing into path dependence and context, or does the difference stem from individual actors distributed by chance? This paper cannot answer this multitude of questions, but rather highlights an entry point by showing ways of exploring the usefulness of new Big Data sources for entrepreneurship research with extension to the spatial dimension. The focus on the spatial level of sub-national regions is used because it is the most relevant geographical context dimension for entrepreneurial activities, as numerous scholars have shown (e.g., Sternberg 2009; Feldman 2001).

Our research is explorative in terms of the core indicators used because this is the first attempt to apply the German web portal 'Presseportal' of the dpa (German Press Agency) subsidiary 'news aktuell' for research on regional entrepreneurial activity and media coverage. Since research on this topic is still rare (see also Wang, Mack and Maciejewski 2017), opening up new approaches through Big Data could lead to much-needed progress.

The remainder of the paper is structured as follows. We start with an overview of why media coverage and regional entrepreneurial activity might be related. Section 2.3 provides a description of the data and methodology used. Our empirical results together with a discussion are presented in section 2.4. section 2.5 concludes.

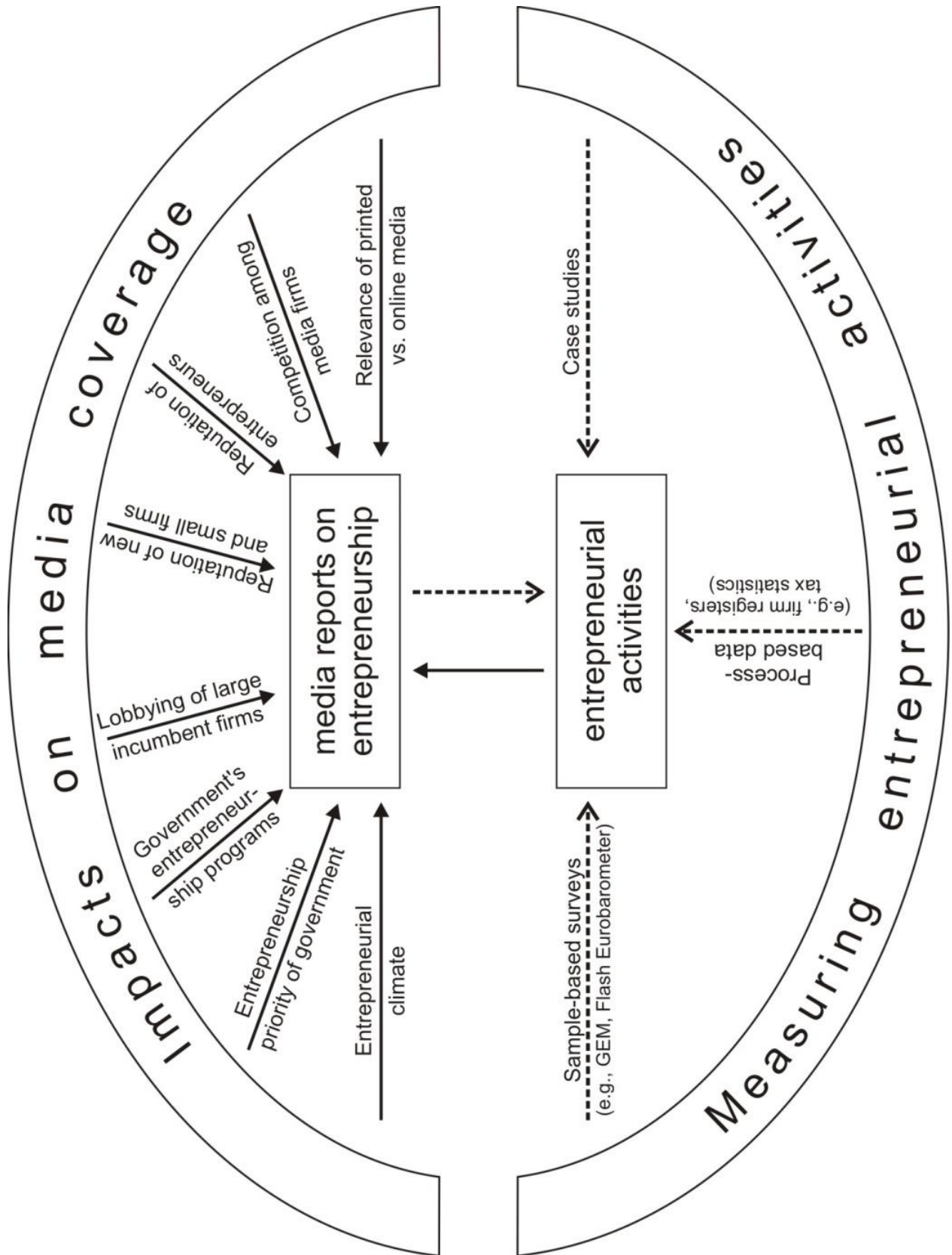
2.2 Entrepreneurship and Media—some conceptual Thoughts and the Role of Big Data

The relationship between media and entrepreneurial activities, both seen from a regional perspective, is rather complex and interdependent (see figure 1). Two main directions may be distinguished. First, media coverage is, besides other determinants, influenced by real entrepreneurship activities in the territory, although not all entrepreneurship activities occurring in a given region will be considered newsworthy by public media, and regional media will not report about regional entrepreneurial activities exclusively.

Second, the extent and kind of entrepreneurship activities and entrepreneurship attitudes in a given region are influenced by the context factor of 'media coverage' because media are noticed by real and potential entrepreneurs and the latter's entrepreneurial behaviour depends on the individual's perception of media news about entrepreneurship. Of course, media coverage is but one of those many factors influencing and being influenced by entrepreneurial activity, but it has hitherto rarely been used even as an outcome or proxy variable of entrepreneurship (e.g., Amodou et al. 2016).

Thus, public media may be considered a context factor that, besides many other context factors and person-related factors, influences entrepreneurial activities as well as entrepreneurial attitudes of individuals or, at the aggregated level, of regional or national economies or societies. In that sense, media coverage of entrepreneurship can be considered an informal institution of entrepreneurial regions (Glaeser et al. 2016; Obschonka 2017). Analysing it as interdependently related to entrepreneurial activities is not necessarily new, but if it is considered as input, context and result of entrepreneurial activity, it is worth a closer look due its potential as a motoric unit to push endogenous growth through new firm formation. While we do not investigate the role of media coverage as a context factor for entrepreneurial decisions, activities or attitudes in this paper, the new indicators discussed here are promising candidates to be used in future research exploring the relationship between said dimensions of entrepreneurship and this rather rarely used factor in empirical entrepreneurship research.

Fig. 2.1: The relationship between media Coverage and entrepreneurial activities



Related to this perspective on the relationship between media coverage and entrepreneurship activities, we introduce Denzau and North's (1993) sender-receiver model as a second theoretical foundation of our main argument, and it can be combined with the (regional) context argument explained above. The sender-receiver model has recently been introduced to regional entrepreneurship research, related to regional role model effects in particular (see Wywrich, Stuetzer and Sternberg 2016). For our purposes, the mainly non-social interactions between entrepreneurs or entrepreneurship activities in a given region on the one hand and, on the other hand, those who write about such activities (journalists, bloggers and the like) can be explained with the help of a sender-receiver model. The entrepreneurs, their activities and the related events are the senders that transfer signals to the receiver, who is an observing journalist or blogger. Depending on the personal perception, the signals are interpreted in a positive or in a negative way, but rarely as neutral. The way he/she interprets them also depends on the context he/she is living and working in (e.g., previous experiences with entrepreneurship or reactions to his/her previous publications regarding entrepreneurship). In a next step, of course, the news the journalist writes may have effects on real or potential entrepreneurs who read it. The news will be supportive or a hindrance with regard to entrepreneurial intentions or activities. However, these latter processes are not the main focus of our paper, but will be addressed in the named sentiment analysis. The application of this sender-receiver model to news producers provides fruitful connections to the entrepreneurship literature on (regional) opportunity recognition (see e.g. Arenius and Minniti 2005, Stuetzer et al. 2014), applied to news producers instead of entrepreneurs. Note that the ambivalence of these signals should be considered: the same signal (e.g., a given entrepreneurial action) may be perceived very differently by different receivers, so the medial consequences might be very different, too, depending on the perception of the journalist, the blogger or others who produce the news (or decide not to write a story about it). Some of these processes are, at least partially, psychologically driven and are not just person-specific, but also region-specific (contexts are space dependent), as recent empirical research by psychologists with respect to regional entrepreneurship has shown (e.g. Fritsch et al. 2018 on German regions or Ebert et al. 2018 on the correlation between courage and entrepreneurship in US regions). In our paper, the opposite direction matters most: how are entrepreneurship activities covered by the media, namely news media? In other words, is entrepreneurship news a good indicator of real entrepreneurship activities at the regional level? Because both directions of these effects are interdependent, they have both been included in figure 2.1.

Measuring the impact of media on economic events and vice versa, massively harvesting and analysing public media coverage of those events are still surprisingly unused in academia to our knowledge. Various studies have developed evidence for older states of mass media by which media coverage of news on economic processes or events impacts the very nature of the subject itself (Coyne and Leeson 2004; Goidel and Langley 1995; Doms and Morin 2004; De Boef and Kellstedt 2004; Wartick 1992; Carroll and McCombs 2003). We argue that on the one hand, today's media show certain similarities to this, but on the other hand, they have a completely different dimension in quantity and quality. This is the case for both digital media that is, in regards to the state of research, new and analogue news media such as daily newspapers. Media need to be revisited due to the ubiquity of available access to news, posts, tweets and 'stories' of vastly different frequency, content, tone and quality. Furthermore, regional aspects have to be explored but are not as easily attributable as classic newspapers. A rewarding field of study lies ahead.

More recent impact of news or media coverage with links to Big Data can be drawn from the narratives literature. Shiller (2017: 49) states that '*research [...] needs improvement in tracking and quantifying narratives*', which we attempt in this paper. Narratives may help us to understand the relationships of news reporting and regional entrepreneurial activity as Roundy (2016) showed, theorising entrepreneurial ecosystems (EES) as both sources of narratives and being influenced by them, e.g., through role model display (see also Spigel 2015). Research in this new field of the discipline, the systemic view of interdependencies of entrepreneurial activity and (regional) context factors (and between the latter themselves), is based predominantly on traditional data sources. However, with the slowdown of breakthrough discoveries, it is necessary to look for ways to picture entrepreneurship from other sides by exploring new data sources.

When it comes to EES, there is a significant research gap in many aspects of the phenomenon due to missing reliable (quantitative) empirical longitudinal and cross-sectional data. The role of media or narratives in EES is no exception. As an important medium to broadcast success stories, to push constant visibility of entrepreneurial related events or to boost a region's spirit and culture towards a 'start-up mentality', it could potentially play a crucial role. However, empirical evidence to assess the actual causal impact on, e.g., the total amount of start-ups in a given region is scarce and would probably require more qualitative than quantitative methods and data.

Regional (sub-national) approaches to analysing media coverage come with additional challenges. The quality, frequency and focus of reporting and its impact and the digital availability of regional news sources and their localizability can vary considerably. However, for academic disciplines such as economic geography or regional science, this opens a promising new line of questioning to identify spatial patterns and causal relationships between regional economic processes or events and news coverage of those events in both directions. Mass media coverage in the form of news could potentially be used to estimate different kinds of space-sensitive context factors leading to regional entrepreneurial activity and the activity itself. Not only context factors, but also different kinds of entrepreneurial activity interact with media coverage. Regional differences in media coverage of entrepreneurial events may be rooted in a number of possibilities: a high impact, innovative or fast scaling start-up will probably receive more media attention than necessity-based new firm formation without an innovative idea, a small budget and limited human resources. In general, everything deviating from day-to-day news might be considered newsworthy.

Other conditions resulting in spatial differences of news coverage could be the overall level of entrepreneurial activity, the economic sectors and their shares, different stages of general economic development or simply timing-based conditions such as extraordinary public events or shocks. Additionally, sub-national regions with high density of newsworthy events may undercover, e.g., success stories of new start-ups, which would be headline news in regions with a low density of newsworthy events. Those, in turn, might cover such events more prominently than what would seem proportional. However, certain aspects could lead to masking effects of media coverage or even completely negate them. One advantage for Big Data approaches to news, the amount of produced data itself, could very well have a negative downside by leading to overstimulation of individuals and thereby numbing of reception and ultimately reducing the impact. Additionally, the need of mass media suppliers to produce high impact, sensational articles at high speed and frequency may lead to overestimating events. For older states of mass media, it could be shown that the news stories did not always cover the economic realities (Blood and Phillips 1995; Goidel and Langley 1995; Fogarty 2005). This has to be kept in mind when dealing with current media output as well. Nevertheless, there is a relationship between news coverage and entrepreneurial activity (Hindle and Klyver 2007). As pointed out, the relationship is interdependent. However, in this paper, we deliberately focus the empirical part on just one side of this causal relationship by exploring the degree of presence of entrepreneurship-specific news impacted by entrepreneurial activity in regions. The other

causal direction, the influence of media coverage as a context factor on entrepreneurial activity (e.g., via role model visibility), has received at least some attention (Greenwood and Gopal 2017; Hindle and Klyver 2007). Recently, and predominantly in discussions in which media are important pillars in entrepreneurial ecosystems (EES) (see e.g., Isenberg 2010), influence of entrepreneurial activity on media coverage is vastly under-researched to our knowledge (Hang and Weezel 2007). One of the few studies on this side of the narrative, albeit from a different angle, is by Amodu et al. (2016). To explore the nature of news coverage on entrepreneurship, they collected articles from four newspapers over the course of three years and analysed them for news on entrepreneurship using content analysis. However, the findings remain descriptive at best, arrived at by categorising and counting the topics of the identified articles. The findings were not set into relation to actual entrepreneurial activity and were not classifiable as a Big Data approach.

Hindle and Klyver (2007) looked into the opposite side of the causal relationship between media coverage and entrepreneurial activity. By relating GEM data for entrepreneurial activity and motive (opportunity and necessity) and perception of news coverage, they found a weak but significant impact of perceived media coverage of entrepreneurship on opportunity-driven early-stage entrepreneurial activity and on owners of young businesses. However, they urge interpreting these results with care. They refer to the reinforcement model from media theory, arguing that mass media are only capable of reinforcing their audiences' existing values and choice propensities, but are not capable of shaping or changing those values and choices, i.e., media news would be unable to increase or decrease entrepreneurial activities in a given region. These authors, however, use a variable that covers the perception of media news impact on entrepreneurship, not the media news themselves. The idea of 'changing' versus 'reinforcement' versus 'shaping' is based upon their extensive review of mass communication theory literature. Organising this literature into these categories, they display three partly contradictory hypotheses on media effects on entrepreneurial behaviour that each had a dominant period in history.

Greenwood and Gopal (2017) found that temporarily higher coverage of specific news may lead to an increase of entrepreneurial activity related to this particular field. We argue that in the long run, our data can help isolate and analyse specific singular aspects of entrepreneurial activity as soon as the data base has increased to sufficient size.

To sum up the state of research in terms of the relationship between media coverage (and its perception) and entrepreneurship activities, empirical research is rare in general, and no Big Data attempts are known to the best of our knowledge. If empirical evidence is available, it focuses on the effects of media coverage on entrepreneurship, but not on the opposite one. Thus, this is the focus of our paper.

In light of recent developments in the fields of machine learning, social media, information storage and availability of huge amounts of untapped data, the way to collect data for scientific research on entrepreneurship needs to be reviewed and challenged (see also Mahmoodi et al. 2017). New approaches and data sources may be worth investigating separately from and in addition to conventional ones, which enables research to uncover hidden aspects that could not be captured with standard survey designs before. Mahmoodi et al. (2017:58) state, '*An integration of Big Data and traditional approaches might help to optimize both the prediction and explanation of behavioural phenomena*'. This is underscored by Big Data application in recent (social) science studies, such as Obschonka (2017), Kosinski et al. (2016), Chen et al. (2017), Wang et al. (2017) and Glaeser et al. (2016), to name but a few.

Coviello and Jones (2004:485) in their overview of '*methodological issues in international entrepreneurship research*', found that the majority of data gathering approaches in this field are quantitative surveys. Such survey-based approaches can yield reliable, high quality comparable data for many countries (e.g., GEM), but nearly all of them have at least some shortcomings. Surveys come at high costs and need manpower to be completed. They cover perceptions of respondents, not facts, and are therefore weak in subjectivity. Transparency and reliability are often difficult to achieve, especially when representative surveys are conducted to collect data on rare events like entrepreneurial activity within the population of regions. If not repeated with necessary frequency, surveys cannot cover dynamic processes or different stages. Furthermore, it takes a lot of time to build a questionnaire and conduct the survey. These complications may lead to sample sizes that are smaller than optimal, a point often argued when it comes to claiming representativeness.

As with perception data, media or news data probably do not depict reality but rather an interpretation of it, which might be glorifying, suggestive, apologetic, hostile or any other form of subjective picture. Depending on the source of the news, there might be a hidden agenda. Setting different news sources into relationships with their content and the sentiment in which they are displayed could shed some interesting light on processes otherwise only discoverable

with qualitative in-depth case studies, but for quantitative data. To dive deep in the natural text processing and analysing of the individual articles, an even more sophisticated dataset containing different sources for news, especially regional coverage, is necessary. To produce and explore this will be the next step in our research, built upon our current findings. But as a first step, we apply a sentiment analysis for the positive and negative dimensions because news stories can be good or bad, but they are seldom neutral (Godbole, Srinivasaiah and Skiena 2007). The tone of reporting matters for how individuals perceive specific events. For instance, the frequency of negative news lowers consumer confidence below what economic fundamentals would suggest (Doms and Morin 2004; Hollanders and Vliegthart 2011a). Changes in corporate reputation similarly are explained by media exposure (Wartick 1992; Fombrun and Shanley 1990; Carroll and McCombs 2003). Hence, besides their (information) content, the frequency and tone of news coverage also influence agents' economic decision-making, of which entrepreneurship is one.

Entrepreneurship represents interesting events that may serve as inputs for journalistic production. The relevance of this input may significantly vary among regions based on many different factors. Most importantly, we expect the frequency of the entrepreneurial event to be a factor in this context. In regions in which entrepreneurship is rather uncommon, such events may receive higher journalistic attention. We do not argue that entrepreneurship in itself is necessarily sensational, but rather that its (in)frequency may produce this characteristic. Journalists in regions with high levels might be less prone to cover each new start-up or idea simply due to them being common. They may not possess the characteristics of a 'sensation' and hence receive comparatively less attention (see also the call of Welter et al. (2017) for more academic attention to 'everyday entrepreneurship' that would surely not be covered by the named types of media). This effect may be counterbalanced by the generally higher frequency of entrepreneurship events. While in these cases a smaller share of events may find its way into the news, the larger share of events may still lead to a higher (absolute) coverage. There is much uncertainty in this, which uncovers a dire need for more research.

As a first exploration, we focus in our paper on a unidirectional impact of entrepreneurship activity on news reporting. This does not cover the complete picture of the causality between these variables, but serves as a venture point to dive deeper into the complex linkages.

2.3 Empirical Approach

Dependent variables: newsworthy entrepreneurial events and sentiments of reports on entrepreneurial activities

We rely on data collected by the German website www.presseportal.de. Presseportal is the web portal of the dpa subsidiary *news aktuell*. It is the largest and most popular PR portal in Germany, with about 9 million visitors per month and over 12,000 companies being represented with their own newsrooms. The webpage has about 65,000 subscribers, mainly journalists and bloggers (Presseportal 2018). Accordingly, our data do not represent news appearing in newspapers or social media, but rather information that actors want to share and would like to see being picked up by a wider audience and that they seek to be distributed by different kinds of influencers and news distributors.

Unfortunately, we do not know which press releases or which share thereof are actually published in newspapers or on social media platforms. This has significant implications. Most importantly, the data are not representative for the actual news coverage in regions or with respect to specific topics. We do not even know to what extent they correlate to what readers might find on average in newspapers or other news outlets. However, a press release is one of the most important PR tools and provides journalists with their raw material, which is regular, reliable and usable information (Walters and Walters 1992). Our dataset therefore provides a detailed picture of what newsworthy events take place in a region. Notably, this picture is taken before professional journalistic editing and selection. In this case, newsworthiness is determined by actors responsible for or participating in events, which implies that news is, ultimately, 'not what happens, but what someone says has happened' (Sigal, 1986). In our case, the 'someone' is not the journalist, but actors issuing press releases. In summary, the data contain information on events for which actors believe a certain public interest exists and that have a chance of being picked up by different sorts of news outlets. This has to be kept in mind when interpreting the results.

We downloaded the news data from the webpage for somewhat more than two years (May 2016 to November 2018). While at first we were able to get data entries that were a few months old, in early 2017, the access was restricted by dpa to downloading a maximum of 1,000 releases from the point of time of scraping. We restructured the data gathering to be done on a daily basis. The press releases were automatically accessed, downloaded and processed into a database.

In total, we retrieved 100,701 press releases, which corresponds to about 2,800 releases per month. The releases contain a unique id, a title, a fixed URL, a text body, the date of publication, classification into one of six broader topics ('financial', 'economics', 'politics', 'sport', 'culture' and 'miscellaneous'), a list of keywords and an identification number for the publishing actor. Unfortunately, the keywords and broader topics proved to be of rather general nature and hence of little value. We therefore focus on the text body to obtain the information of interest: location and content.

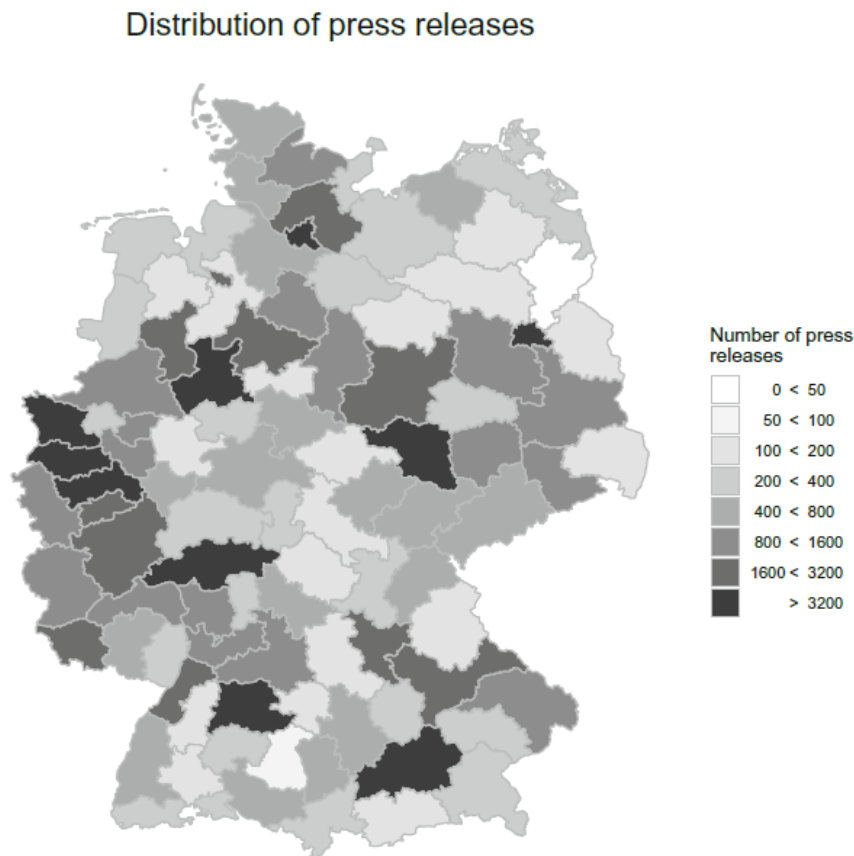
To extract locational information from the text, we first obtained a list of all places (settlements, villages, towns, cities) in Germany from the OpenGeo-database (<http://opengeodb.giswiki.org/wiki/OpenGeoDB>). The database contains the names and geographical coordinates of more than 11,000 places in Germany.

The geographical geolocating was a multistep procedure. First, we extracted the information about the location of the press releases' newsrooms, i.e., the location of the actor that submits the press release to the Presseportal. This is consistently given at the beginning of the text. However, this information does not necessarily refer to the exact location where the event the press release is informing about actually took place. We therefore extracted additional locational information from the remaining body of text. Using a string matching procedure, we identified all words potentially indicating locations in the text. Subsequently, the potential locations were checked and in some cases adapted to allow for unique matching. This particularly applies to city names that are combinations of multiple words such as the city of 'Frankfurt am Main'. Here, alternative versions of the location's name exist, e.g., 'Frankfurt/Main', 'Frankfurt a. M.', 'Frankfurt a. Main', which had to be identified and harmonised. Another problem is names that refer to multiple (distinct) locations. For instance, the name 'Halle' may refer to the city 'Halle an der Saale' or 'Halle (Westfalen)'. In these cases, we searched the texts for additional information giving indications on the correct location, for example, the name of the federal state or surrounding region (e.g., 'Sachsen-Anhalt'). More problematic cases are location names with multiple meanings, with the city of 'Essen' being a prime example. It literally translates into 'food' or 'eating', a word that appears at relatively high frequencies in the releases without referring to the city. Lacking an alternative, we had to drop such cases, which means that certain locations (foremost 'Essen') do not appear in our empirical analysis. In future research, more advanced matching algorithms might be able to deal with these cases. Our approach also implies that multiple locations can be assigned to a single article.

In fact, this happens relatively frequently with press releases referring on average to almost two (1.9) locations. The reason for this is that press releases frequently apply to multiple locations or they deal with relationships between locations. Moreover, some releases cover multiple events in different locations. To ensure a high quality of the location procedure, we split the press releases into paragraphs. Press releases have on average about 4.9 paragraphs. If a location was found in a paragraph, it will be assigned to this paragraph (and the content therein). If no locational information was found, the location of the release issuer (the organisation behind the corresponding news rooms) was assigned to the paragraph. We identified (entrepreneurial) events in the press releases at the level of paragraphs as well. Accordingly, the link between events and locations are established at this level. Nevertheless, when counting events, we count at the level of full press releases to avoid discriminating single versus multiple paragraph releases. In practice, this means that a press releases will be counted multiple times when the information on a specific (entrepreneurial) event and location coincide in multiple paragraphs or when multiple locations or events are found within the same paragraph. However, this occurs only in 3% of all cases. While there are just 1.2 locations per paragraph in general, we identified about 1.5 locations on average in paragraphs containing entrepreneurial events.

In total, we have been able to assign at least one location to 85,439 press releases, which corresponds to a success rate of almost 82.6%. Based on the location information, we aggregated the press release information to the 96 German planning regions defined by the BBSR. Figure 2.2 shows the geographical distribution of press releases in those regions. Clearly, most press releases are reported in cities, with the absolute population being a very good predictor of the number of press releases ($r=0.82^{***}$).

Fig. 2.2: Map of news distribution



To identify press releases relating to entrepreneurial events, we compiled a list of 69 words clearly referring to entrepreneurial activities. We filtered the press articles according to these words. In total, 2,952 press releases and 5,887 paragraphs included at least one of these words. Table 1 shows the ten most frequent keywords. Note that multiple keywords may be found in one press release.

Table 2.1: Keyword frequencies

Rank	Keyword	Count
1	Startup & start up	2160
2	entrepreneur	250
3	unternehmertum	186
4	unternehmensgründ	174
5	accelerator	150
6	venture.capital	125
7	Junge unternehm& jungunternehm	217
8	existenzgründ	96
9	inkubator	82
10	risikokapital	81

Figure 2.3 visualises the spatial distribution of entrepreneurial press releases by colouring regions according to the share of releases referring to entrepreneurial events. Interestingly, the strong relationship to population disappears, and rather rural regions in proximity to urban regions seem to be characterised by large shares. However, the distribution is rather inconclusive and demands more comprehensive analyses.

We use the press-release information to construct our dependent variables. The first one is `ENTRE_COUNT`, which is the number of press releases that include at least one of the keywords related to entrepreneurial activities. It captures the frequency with which entrepreneurial events are considered newsworthy and are consequently featured in press releases. Alternatively, it can be interpreted as the intensity of regional entrepreneurship events being fed into the journalistic process and hence, potentially, being covered in news.

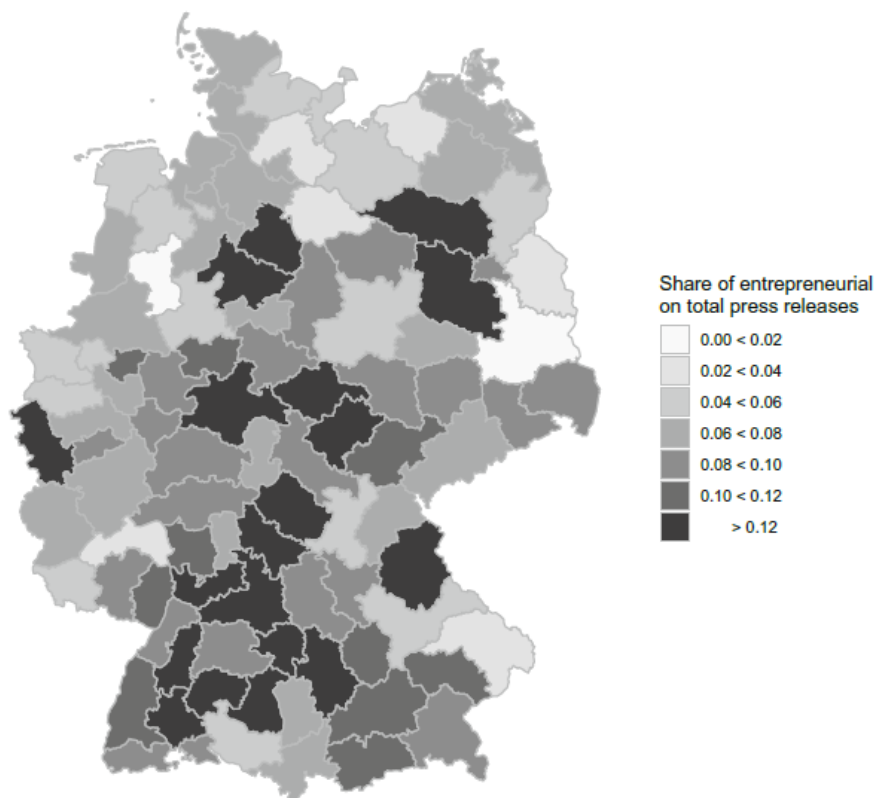
Our second dependent variable captures the way entrepreneurial events are reported in press releases. Sentiment classification is the task of determining the overall sentiment orientation (if any) in a text (Ohana and Tierney 2009). In this study, we apply a lexicon-based sentiment polarity categorisation approach. That is, we consider the text as a collection of its words, disregarding the grammar and word order (a so-called bag-of-words approach). Among these words, we count the number of words associated with 'positive' and 'negative' sentiments in each press release. Crucially, we need a definition of words' polarity, i.e., their degree of 'positiveness and negativeness'. In a common manner, we rely on a list of words that are pre-coded with respect to their polarity (Taboada, Brooke, Tofiloski, Voll and Stede, in press). For this paper, we utilise the *SentimentWortschatz* (*SentiWS*), which is a publicly available German-language opinion lexicon listing positive and negative polarity-bearing words, with polarity values ranging between $[-1,1]$ (Remus, Quasthoff and Heyer 2010). To apply this approach, we first clean the texts and remove unwanted characters, addresses, links, numbers, punctuation and German stop-words. Second, a document term matrix is created and weighted with the polarisation values of the sentiment dictionary (*sentiWS*) using a linear model (Feuerriegel and Proelochs, 2018). That is, each press release's sentiment score is the sum of polarization weights of the word tokens. Their aggregate at the regional level (`SENTIMENTS`) represents the average sentiment of a region's press releases, which will serve as a control variable in some empirical models. By restricting the sample to press releases containing entrepreneurship-related keywords, we create the second dependent variable

(ENTRE_SENTIMENTS) giving insights into regional variations in sentiments of entrepreneurship press releases.

While this is a relatively simple approach, it is efficient and capable of achieving high levels of accuracy (Richard and Gall 2017). Given that we apply this approach to more than 85,000 texts totalling more than 74,067,694 words, efficiency in particular is a crucial dimension in this context. Of course, efficiency comes at some costs. For instance, we cannot handle negation and intensification. Moreover, we concentrate on polarity and do not consider other sentiments such as anger and dislike. Crucially, we also do not know the extent to which the sentiments are directly associated to the entrepreneurship events reported in the press releases. If these are not the primary content of the releases, our analysis is likely to associate sentiments concerning other topics to these events. Accordingly, our measure reflects the general sentiments in press releases that also refer to entrepreneurship events. This has to be taken into consideration in the interpretation of our results and also indicates potentials for improving this type of analysis in future studies.

Fig. 2.3: Map of share of entrepreneurial news

Share of entrepreneurial press releases



2.4 Explanatory Variables

To explore the relationship between news and regional entrepreneurial activities, we rely on GEM data. More precisely, we use an excerpt of a unique set of regional GEM data for Germany. By pooling annual representative national Adult Population Survey (APS) data (respondents were between 18 and 64 years old), including location information of respondents, we circumvented the insufficient number of cases per year and region that usually troubles sub-national level analysis with these data. The result is a unique regional GEM dataset for Germany. A standard GEM APS consists of at least 2,000 cases per country and year.

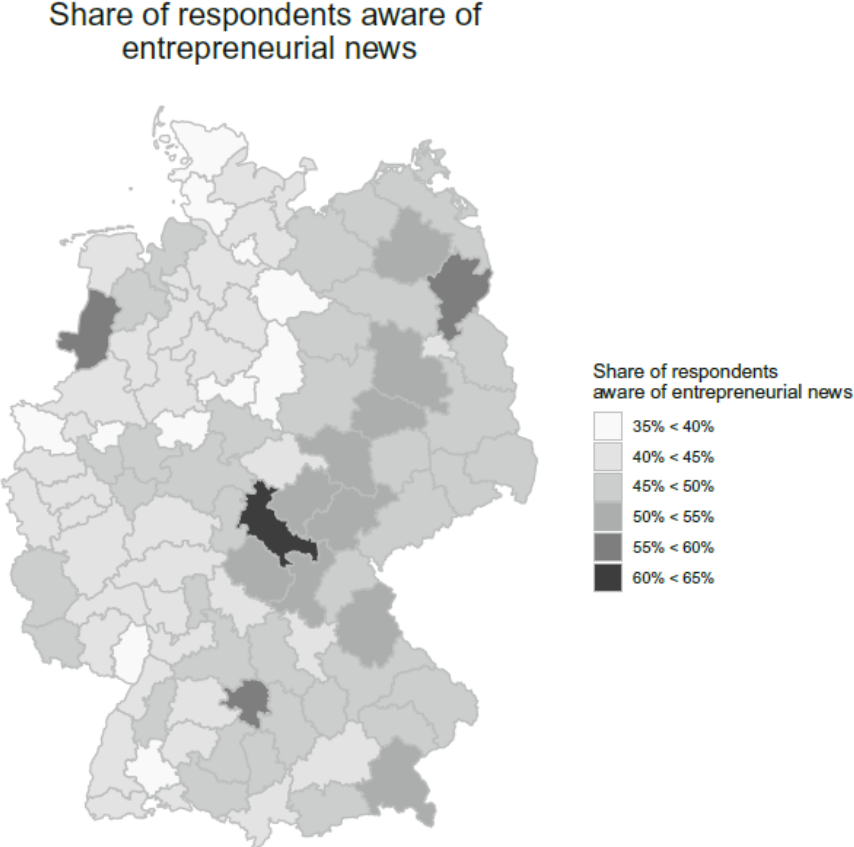
For this paper, we used a dataset spanning the years 2012-2017. Although we have an implicit time lag to our more recent press release data, we argue that this poses no limitations on our analysis due to the nature of entrepreneurial activity in Germany. The consistently low level of entrepreneurial activity (compared to other innovation-driven countries) has been rather stable over the last decade. Although entrepreneurial activities vary somewhat over time, these variations are rather negligible in terms of magnitude across years. In fact, in most cases, the annual differences are not statistically significant, thereby allowing the pooling of annual data into a cross-sectional dataset (see Sternberg et al. 2018). It also implies that we do not need to consider a time lag between press release information and entrepreneurial activities and assume as well treating both as time-invariant. Future research should nevertheless more systematically explore potential long-time variations.

We use the GEM data to create two variables. The first is FOUND, which is based on the quota of the GEM variable TEA (Total Early-stage Entrepreneurial Activity). It is calculated by the number of respondents with TEA='yes' divided by the number of respondents with TEA='no' for each region. A respondent is considered in the estimation of TEA when he/she is either a nascent entrepreneur actively pursuing a business foundation or if he/she manages a business less than 42 months old. Accordingly, the measure captures recently founded businesses and start-up intentions. It represents an excellent proxy of entrepreneurial activities that takes into account that entrepreneurship is a process and not a status. We therefore argue that TEA measurement of GEM is superior to alternative approaches, foremost those using registers that exclusively cover successful entrepreneurs.

The GEM data offer a range of additional information on demographics and entrepreneurship intentions. In the context of this study, we are particularly interested in information on the

perception of (entrepreneurship) media coverage that is also included. More precisely, we focus on the variable NBMEDIA. It summarises the respondents' answers to the statement '*In [your country], you will often see stories in the public media and/or internet about successful new businesses*'. The answer can either be yes or no. The GEM variable is worded towards the national scale, but we argue that the respondents' actual perceptions are influenced by their regional context. Although this allows us to use this variable for our analysis, it may lead to a reliability problem of NBMEDIA for national level calculations. By including it in this analysis, we try to estimate the quality of NBMEDIA as proxy for covering news on entrepreneurship alongside our main focus. We create a regional aggregate (MEDIA) indicating the share of positive answers on total regional respondents. Figure 2.4 illustrates the spatial distribution of this variable. It indicates the existence of an East-West discrepancy, with values in East Germany (former GDR) (av. 49.98) being on average higher than West-German regions (av. 44.3)¹. However, this may in part also be explained by the East's lower degree of urbanisation because this measure correlates negatively with population density at $r=-0.27^{***}$.

Fig. 2.4: Map of share of respondents aware of entrepreneurial news



¹ The difference is statistically significant at 0.01, as indicated by a two-sample t-test.

Our first major control variable is based on press release information and counts the number of press releases per region (RELEASES). It primarily serves as a control for variations in regions' general likelihood to appear in press releases. It captures potential differences in the occurrence of newsworthy events and variations in the propensity that these events will translate into press releases.

In addition to press release information and GEM, we consider a list of control variables that account for fundamental differences between regions that might impact the relationship between entrepreneurship and press releases. These data are taken from official German statistics accessible via www.inkar.de. This database collects information from national and federal statistical offices in Germany and supplies numerous indicators for various spatial scales. Population size (POP) and population density (POPDEN) control for absolute numbers as well as agglomeration and urbanisation factors, which can strongly influence entrepreneurial activity (see Bosma and Sternberg 2014). GDP per capita (GDP_PC) controls for economic strength, and STUDS equals the amount of students at higher-education institutions per 1,000 inhabitants, being a proxy of knowledge creation and potential university existence and spin-offs. UNEMPL are unemployed persons of all employable inhabitants. To take into account still existing fundamental differences between regions belonging to the former GDR (East Germany) and West-Germany, we include a dummy (EAST) that is 1 if a region is located in East Germany and 0 otherwise.

2.5 Methodology

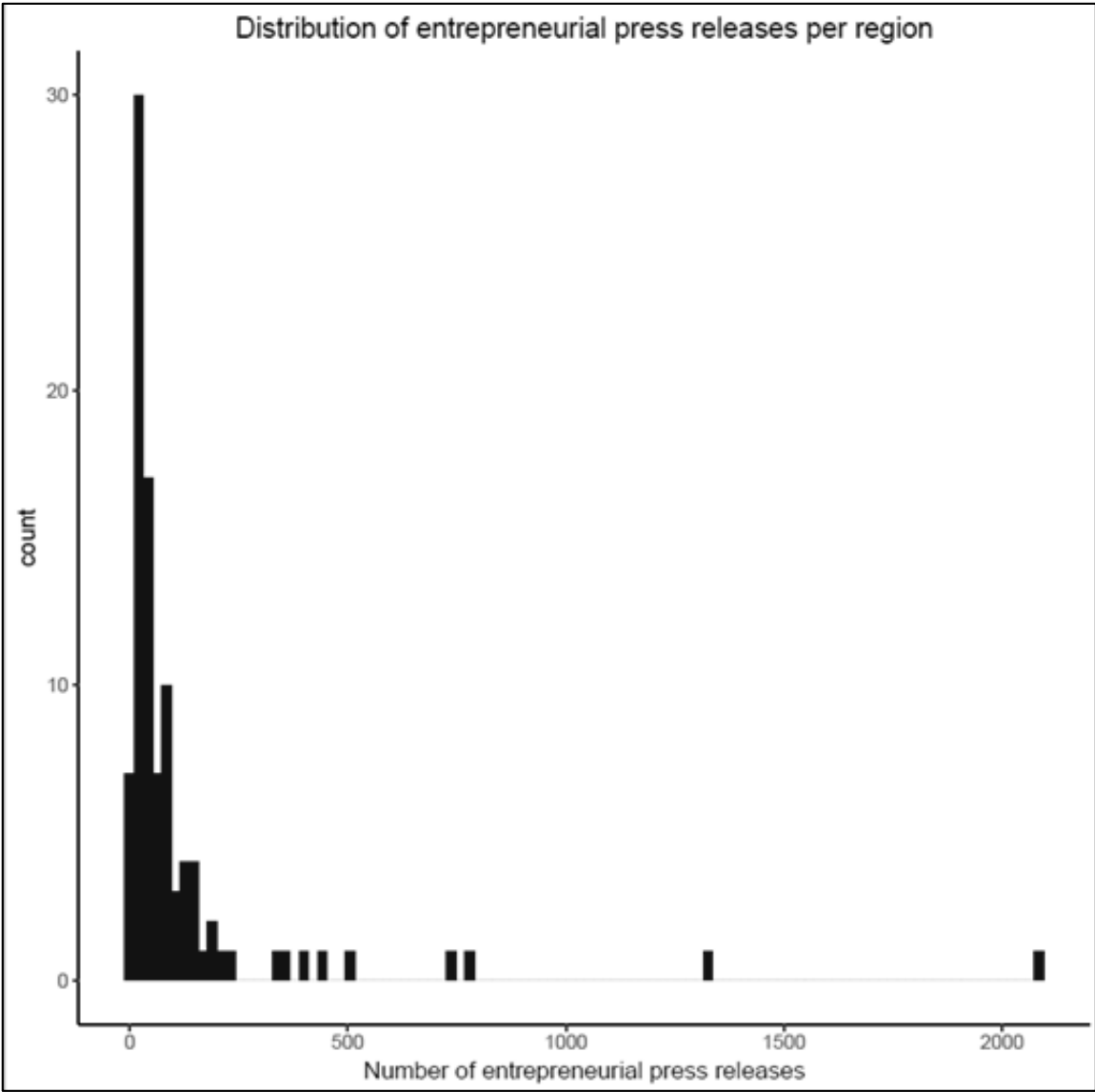
The aim of the present paper is the analysis of the potential relationship of news and entrepreneurial activities at the regional level. That is, we want to explore to what extent variations in the levels of regional entrepreneurial activities are mirrored in news (as approximated by press releases). As pointed out, our first dependent variable is the number of press releases per planning region, which is a count variable. Figure 2.5 shows the variable's distribution, which clearly signals over-dispersion. This is confirmed by the over-dispersion test of Cameron and Trivedi (1990)². Therefore, we employ a negative binomial regression³. We do not find any indications of spatial autocorrelation, multicollinearity and outliers. Given that few keywords dominate the identification of entrepreneurial news or press releases (table 2.1: Keywords), we test the robustness of the results with respect to their selection. For this, we re-run the analyses based on press releases identified to contain entrepreneurship-related context based on the two most important keywords ('start-ups' and 'entrepreneur').

Our second analysis focuses on the explanation of regional variations in the sentiments characterising entrepreneurship-related press releases. The variable ENTRE_SENTIMENTS representing the average sentiments of such press releases in a region is continuous, non-truncated or censored. Accordingly, simple OLS regression is appropriate. When log-transforming the dependent and all independent variables, the according models meet most assumptions. There are no signs of multicollinearity and spatial autocorrelation. The normal distribution of the errors can also not be rejected (when considering all control variables). However, we have to exclude Berlin, which distorts the estimations as an outlier. Moreover, despite taking the log of all variables, heteroskedasticity cannot be rejected. We therefore employ robust standard errors. To further substantiate the estimations, we calculate the 95% confidence interval of the coefficients using a bootstrap approach with 1,000 replications. Lastly, we use a binary logistic regression on a binarised version of the dependent variable that is 1 if the mean sentiments on entrepreneurship-related press releases are larger (more positive) than the mean across regions and 0 otherwise.

² The dispersion statistic is $d=29.65$ and $z=3.10$ with the $p\text{-value}=0.0009732$.

³ For completeness, we also show the results of Poisson regressions. While the two models' coefficients are almost identical, the Poisson regression yields smaller standard errors and hence more statistically significant results.

Fig. 2.5: Distribution of entrepreneurial news per region



2.6 Results and Discussion

Table 2.2 presents the results of the negative binomial and Poisson regression analyses with the number of entrepreneurial press releases in a region as the dependent variable. Our baseline model is reported in the fourth (negative binomial) and seventh (Poisson) columns labelled 'general'. The previous three columns contain models of robustness checks, including different sets of explanatory variables. The fifth and sixth columns, labelled 'entrepreneur' and 'start-up', give insights into models in which the identification of entrepreneurial press releases is based on the two most common keywords.

With the different models, we try to understand the regional dimension of newsworthy entrepreneurship events with a particular focus on alternative measures of entrepreneurial activities. That is, we seek to explore the potential of news data as a new source for insight into regional entrepreneurial processes and activities.

All models are reliable, and the Poisson estimations in particular show high pseudo-R² values, suggesting that we are able to explain significant portions of the interregional variations in entrepreneurship-related press releases. Moreover, the coefficients of the control variables correspond to our expectations by and large. The most important predictor of entrepreneurship-related press releases is the total number of press releases in a region (RELEASES). Accordingly, the more events take place in a region (or are reported about), the more frequently entrepreneurial events are among them. Population (POP) relates positively to the number of entrepreneurship-related press releases. However, population density obtains a significantly negative coefficient, suggesting that in urban regions, either entrepreneurial events are less likely deemed newsworthy or that less of these events take place. Given that the latter contrasts with a well-accepted fact in the literature (e.g., Bosma and Sternberg 2014), entrepreneurial events seem to be perceived as less relevant to report about in urban regions.

We observe higher reporting rates of entrepreneurial events in regions with more higher-education possibilities (STUD) that are approximated by the share of (higher-education) students in regions' total populations. Hence, in such regions, entrepreneurial events are more likely to be considered newsworthy and included in press releases. Most likely, this is due to higher frequencies of occurrences. The same applies to regions with higher levels of GDP per capita. This is likely related to opportunity entrepreneurship, which dominates necessity entrepreneurship in Germany.

Another interesting finding is that in regions belonging to the federal states of the former GDR (EAST), the share of entrepreneurial press releases is consistently higher across all models in which entrepreneurial press releases are identified with the occurrence of the word 'entrepreneur' alone. Anecdotal evidence suggests that the use of the word 'entrepreneur' is less common in this part of Germany. Accordingly, this finding may hint at cultural/historic differences in regional languages that are inherent to this type of data. A comparison of other text may substantiate this in a more systematic manner in future research. The sentiment analysis indicates that entrepreneurship news in East Germany have the tendency to show negative sentiments (Table 2.3). This shows that our data are able to display at least two different dimensions of impact, quantitative and qualitative ones.

The coefficient of our focal variable, FOUND, remains insignificant in negative binomial regression (except for the 'start-up' model). It becomes significantly negative in the Poisson analysis (also because of its negative link with the appearance of 'start-up' references in press releases). This finding implies that the reporting intensity of entrepreneurial events is not higher in regions in which more entrepreneurial activities take place. This contrasts with our expectations, but might be explained by a kind of customisation effect. We suspect that in regions in which entrepreneurship is a relatively frequent event, people perceive them as less newsworthy because they are rather common. Accordingly, they are relatively less likely to be found in press releases. If this effect also translates into lower news coverage of entrepreneurial events (our analysis only covers the input into the news process, not the actual output), this finding may have significant implications for innovative, start-up producing ecosystems that are typically located within larger cities and dense areas. Another possible explanation might be in line with the negative impact of population density (especially within the 'start-up' model). This effect is based upon urban areas showing higher numbers in absolute amount of non-entrepreneurial newsworthy events in relationship to entrepreneurial ones, which reduces the share of entrepreneurial news. Newsworthy entrepreneurial events may find themselves in stronger competition with a broader spectrum of other reportable events, such as political, sportive, etc., that are most likely overrepresented in such regions.

Our second focal variable is MEDIA. It gains a significantly negative coefficient in all models. We therefore find empirical support for less frequent reporting on entrepreneurial events in regions in which individuals indicate higher exposure to entrepreneurial news. Put differently, while subjectively individuals perceive relatively little news coverage of entrepreneurial

activities in their region, we actually observe a comparatively higher reporting of such. This finding holds even when excluding all control variables and running the models in different specifications. The finding comes as a surprise and may even seem paradoxical at first. However, there might be a plausible explanation. News coverage of entrepreneurial events may in fact be lower in regions in which individuals indicate lower exposure. Again, it may be the difference between inputs and outputs into the journalistic processes that play a role here. Our press release data only cover the input, and it is unclear to what extent this is representative for the actual output, i.e., what can be found in newspapers. In this case, MEDIA reflects regional differences in the journalistic filtering process. However, there might also be another mechanism at work. The survey question underlying MEDIA actually aims at news coverage in national media, which may or may not reflect the situation in regional news. Respondents from regions with relatively high coverage of regional entrepreneurship activities may compare this coverage at the national level, which may cast a negative verdict about its intensity and vice versa. However, this interpretation needs further research and remains speculative at this stage.

After we have discussed the spatial distribution of entrepreneurship-related press releases and their relation to other entrepreneurship variables, we focus on the connotation in which these press releases are expressed and what sentiments they contain. Table 2.3 represents the results of the regressions with the regionally aggregated sentiment scores of the entrepreneurship-related press releases as dependent. Columns one to five show the results of the OLS regressions that are estimated with heteroskedasticity robust standard errors. While all residual diagnostics (normal distribution, VIF, autocorrelation, homoskedasticity) confirm the appropriateness of the estimations, we run additional robustness checks. Firstly, we estimate the significance using a bootstrap approach. The corresponding upper and lower boundaries of the 95% confidence interval are given in columns 6 and 7. Secondly, we calculated a binary logistic regression with the dependent variable being one if the sentiments of entrepreneurship-related press releases are higher than on average across the regions. All models yield relatively comparable results, that is, most variables remain insignificant. While regional population (POP), population density (POP_DEN), and GDP become significant in the full OLS model (model 5), the according coefficients in the bootstrapped and logistic models remain insignificant. This casts doubts on their robustness. Nevertheless, with some caution, it suggests that entrepreneurship-related press releases are more positive in urban regions (high population density), while more

negative in large regions (large population) and those that are economically better off (higher GDP per capita).

A robust result is obtained for the variable MEDIA. It is significantly positive in all models. At first this finding seems to contradict the regression results on the number of entrepreneurship-based press-releases (Table 2.2). However, here, it clearly corresponds to our expectations. Press releases in regions with higher MEDIA scores, i.e., higher levels of perceived media coverage of successful new businesses, contain more positive sentiments of entrepreneurship. Given the cross-sectional nature of our analysis, we cannot make a causal inference here. Nevertheless, the result suggests that frequent reporting about entrepreneurship and narratives about new businesses in the news, might be able to impact sentiment towards entrepreneurship at the regional level. In any case, the finding confirms a link between news based data and that obtained by surveys. Given that sentiments are shown to drive economic development in general (Baker, Bloom and Davis 2016), it can be expected that this relation also holds for regional entrepreneurial activities in particular. Accordingly, while our results only indicate that news may influence sentiments towards entrepreneurship, it can be argued that they are likely influencing actual entrepreneurship activities. While such interpretation is rather explorative and speculative at this stage, it clearly outlines new avenues for future research exploiting new(s) data and sentiment analyses.

This finding is in line with the (positive) display of role model entrepreneurs and new businesses. It also corresponds to the theory body on the impact of narratives on entrepreneurship and shows that journalist as senders within a sender-receiver model, can have significant influence on how phenomena are perceived.

In any case, to the best of our knowledge, the regression results are the first findings on systematic variations of topic-specific sentiments at the regional level. Moreover, they are also the first that explain parts of these variations, although admittedly, the parts are rather small. With these findings in mind we explored a second news data source, pressebox.de. Pressebox covers mainly news on technical and innovative content as soft and hardware, e-commerce and such. While showing similar patterns, the overall sentiment of this site (unrelated to news content) was much higher than the dpa source which prohibited merging (in addition to having a specific content emphasis). However, this second data set might yield some confirmation as well as further insight which we will explore in future research.

Table 2.2: Regression results

	<i>negative binomial</i>		<i>negative binomial</i>		<i>Poisson</i>		<i>Poisson</i>	
	General	General	General	Start up	General	Entrepreneur	Start up	Start up
RELEASES	0.0003 (0.00003)	0.0001*** (0.000004)	0.0002*** (0.00001)	0.0002*** (0.00001)	0.0001*** (0.000001)	0.0002*** (0.00004)	0.0002*** (0.00001)	0.0002*** (0.00001)
POP		0.0001*** (0.000002)	0.0001*** (0.000002)	0.0001** (0.000004)	0.0001* (0.000003)	0.0001*** (0.000002)	0.00003*** (0.000001)	0.00003*** (0.000001)
POPDEN		0.00005 (0.00003)	-0.001** (0.00003)	-0.00003 (0.001)	-0.001 (0.0004)	-0.0002 (0.0002)	-0.0005*** (0.00001)	-0.0005*** (0.00001)
GDP_PC			0.034*** (0.012)	0.017 (0.027)	0.021 (0.020)	0.030*** (0.012)	0.068*** (0.004)	0.068*** (0.004)
STUDS			0.012*** (0.004)	0.011 (0.009)	0.005 (0.007)	0.018*** (0.005)	0.004** (0.002)	0.004** (0.002)
UNEMPL		-0.039 (0.054)	0.034 (0.056)	-0.120 (0.136)	0.103 (0.093)	-0.103 (0.077)	0.200*** (0.026)	0.200*** (0.026)
EAST	-0.039 (0.221)	0.036 (0.204)	0.150 (0.328)	1.644** (0.784)	0.107 (0.546)	1.441*** (0.414)	0.007 (0.150)	0.007 (0.150)
FOUND	-0.053 (0.038)	-0.055 (0.035)	-0.048 (0.033)	-0.117 (0.086)	-0.128** (0.056)	-0.070 (0.054)	-0.105*** (0.020)	-0.105*** (0.020)
MEDIA	-0.044** (0.018)	-0.031* (0.017)	-0.035** (0.017)	-0.137*** (0.047)	-0.097*** (0.030)	-0.092*** (0.027)	-0.085*** (0.009)	-0.085*** (0.009)
Constant	6.026*** (0.873)	4.877*** (0.850)	3.635*** (1.050)	5.478** (2.689)	5.099*** (1.760)	2.816* (1.638)	2.841*** (0.542)	2.841*** (0.542)
Mcfadden	0.11	0.13	0.14	0.18	0.17	0.74	0.86	0.86
Moran I (p-value)	0.18 (0)	0.16 (0)	0.16 (0)	-0.01 (0.5)	0.04 (0.23)	-0.02 (0.55)	0.06 (0.13)	0.06 (0.13)
Overdispersion p-value								
Observations	96	96	96	96	96	96	96	96
Log Likelihood	-492.126	-482.930	-474.032	-153.836	-310.674	-182.589	-680.724	-680.724
theta	1.883***	2.251***	2.695***	0.886***	1.106***			
Akaike Inf. Crit.	994.253	977.859	968.064	327.672	641.347	385.179	1,381.448	1,381.448

Note: * p<0.1; ** p<0.05; *** p<0.01

Table 2.3: Sentiment analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Lower CI 95%	Upper CI 95%	Logit, 1>mean(sentiment)
log(NO_ENTRE_SENTI+1)	-0.283 (0.525)	-0.125 (0.636)	-0.140 (0.636)	-0.132 (0.636)	-0.362 (0.679)	-0.362	-0.362	-5.904 -3.654
log(ENTRE_COUNT)	0.062 (0.067)	0.092 (0.075)	0.095 (0.075)	0.104 (0.082)	0.074 (0.082)	0.074	0.074	0.764 (0.525)
log(RELEASES)	0.076 (0.098)	0.081 (0.099)	0.075 (0.099)	0.068 (0.099)	0.044 (0.099)	0.044	0.044	0.310 (0.470)
log(POP)	-0.161 (0.137)	-0.293* (0.162)	-0.272 (0.166)	-0.277 (0.170)				-1.314 (0.869)
log(POPDEN)	0.189** (0.087)	0.157 (0.102)	0.157 (0.102)	0.151 (0.101)	0.061 (0.084)	0.061	0.061	0.920 (0.663)
log(GDP_PC)	-0.729 (0.452)	-0.711 (0.447)	-0.711 (0.447)	-0.720 (0.458)	-0.643 (0.436)	-0.643	-0.643	-2.545 -2.234
log(STUDS)	0.020 (0.039)	0.021 (0.040)	0.021 (0.040)	0.024 (0.040)	0.006 (0.045)	0.006	0.006	-0.061 (0.286)
log(UNEMPL)	-0.194 (0.129)	-0.122 (0.170)	-0.122 (0.170)	-0.119 (0.173)	0.057 (0.175)	0.057	0.057	-0.181 -1.136
EAST			-0.103 (0.170)	-0.089 (0.169)	-0.347 (0.212)	-0.347	-0.347	-2.219* -1.239
log(FOUND)				0.049 (0.121)	0.033 (0.124)	0.033	0.033	-0.043 (0.697)
log(MEDIA)					0.955* (0.519)	0.955	0.955	9.347** -3.634
Constant	1.150 (0.819)	3.918** -1.924	3.785* -1.915	3.805* -1.953	-1.936 -2.115	-1.936	-1.936	-24.294 -15.847
adj. R2	0.02	0.04	0.03	0.02	0.02			0.13
Breusch-Pagan	0.019	0.047	0.079	0.12	0.232			
Max VIF	4.9	5.4	5.4	5.7	5.4			5.4
Shapiro	0	0.006	0.009	0.011	0.019			
Moran I (p-value)	0.03 (0.28)	0 (0.43)	-0.01 (0.49)	-0.01 (0.5)	-0.05 (0.71)			-0.05 (0.73)

* p<0.1; ** p<0.05; *** p<0.01

2.7 Conclusion

We set out to explore a new dataset—media coverage in the form of news articles—to establish whether reporting of news on regional entrepreneurial events could be a potential new data source for entrepreneurship research and whether it can be characterised as Big Data. The discipline has become quite saturated over the recent decade in many areas by relying on surveys and registers, but new approaches and data sources are necessary to progress and to ultimately address fundamental issues in entrepreneurship research. We could show that different sets of (entrepreneurship-related) keywords lead to diverging results, indicating that content specific analysis of media coverage will be possible. Although the relationship between news coverage and early-stage entrepreneurial activity is rather weak, we are confident that data on news coverage could be used to unveil and differentiate different kinds of entrepreneurial activities and should be revisited. However, at this stage, our empirical results reject the idea of a strong relationship between actual entrepreneurial activities in regions and the intensity of it being reported.

By exploring the sentiment of entrepreneurship news, it became clear that different news sources discriminate systematically regarding the tone of their articles. This introduces challenges regarding merging and building a huge dataset of many news sources, but it also opens up many interesting questions. Sentiment analysis has furthermore shown quite interesting potentials regarding the evaluation of a qualitative dimension as an addition to a quantitative one.

The paper's contribution to the ongoing debate about the value of big data and internet-based information for entrepreneurship research is twofold. First, big data used in this paper has shown to be a serious option when looking for new indicators of regional entrepreneurial activity as news media, at least to a degree, covers such activities. Exploiting the potential of such data requires significantly less time, effort and capital than classical method to collect entrepreneurship data. Second, our approach is currently not able to serve as a complete substitute for traditional methods of data collection as they suffer from some important weaknesses in terms of data quality, accessibility and amount. A relevant contribution of our paper to the named debate is to show some of these limitations, despite the given potential. The combined analysis of big data sources with different analytical approaches seems to offer a completely new level of insight.

The results of this paper have to be interpreted in light of certain limitations. The reported news in the database are localised through algorithms that, although quite good, could be improved. For instance, it might be that a piece of news is related to multiple events in different locations, with entrepreneurship being just one of these events taking place in only one of these locations. Moreover, we have not yet explored the possibility of 'negating' news. Furthermore, our indicator of entrepreneurial activities is based on a survey and our data on news covering a very specific sub-section of all news, i.e., news that are perceived to have the potential of being reported but not necessarily those that are actually reported. So far, it is unclear to what extent our news data actually cover what is reported in national or local newspapers, social media or alternative outlets.

We also found a mismatch between actual reporting of entrepreneurial news and the perception of it, which opens up potential for further research on perception data versus reported events. However, sentiment analysis shows that in regions with higher perception of news about new successful businesses, the reporting on entrepreneurship-related news is more prone to be positive. This paper contributes towards developing new approaches to entrepreneurial phenomena. Although we cannot show a clear impact of regional entrepreneurial activity on regional entrepreneurial news reporting, these 'negative' results progress the knowledge base by contributing iterations that show the necessity of taking different paths or refining, updating and developing the used dataset. Those iterations are an integral part of approximation towards new knowledge.

Big Data approaches come with challenges of their own, as also pointed out by Fan, Han and Liu (2014), that are not necessarily comparable to problems traditional approaches had and have. This raises the need and opportunity for interdisciplinary research as the research becomes ever more computerised and complex. Despite some limitations common to work with new data sources, our empirical approach opens up a vast array of future research possibilities. This includes extending the data source to information on what event has found its way into the printed and electronic media; what has been covered in social media; and what receives 'just' regional and not national attention. This implies harvesting actual published news about entrepreneurship rather than just the potentially published material provided by the dpa.

In general, going forward, one goal has to be to broaden the current data basis of research and modernise it by adapting to data from recent, fast-paced sources such as dpa or pressebox. Further research should also explore the usefulness of other new possible Big Data sources for

entrepreneurship research besides media coverage. However, news-coverage-based approaches such as ours should try to enhance the data basis by finding ways to reasonably merge existing news portals or feeds for increased regional coverage and broaden the empirical basis to open up even more options for analysis. New and untapped databases of articles, such as regional newspaper archives, need to be integrated to increase the amount and spread of regionalised data. Pursuing the question of whether the actual content of news articles has an impact or if it is simply based on the headlines of those articles since most overstimulated recipients of digital media only scan the news supply and just read what piques their interest through click-bait titles would be difficult, but scientifically very rewarding.

One other major challenge will be the determination and unravelling of causal linkages between news as a form of narratives and regional entrepreneurial activity or even entrepreneurial ecosystem conditions or development. As theory hints, it is clearly interdependent, to which extent and through which mechanisms have to be pursued empirically. How does which kind of entrepreneurial process coverage or narrative impact the regional start-up rate or quality? As new fields of data and data processing open up, the possibilities and need for new approaches and research questions emerge.

Entrepreneurship researchers may learn several lessons from this paper. First, while the used media data sources undoubtedly have large potential to at least partially replace current methods to collect data on entrepreneurial activity at the regional level, more experiences and results are needed to better assess the precise value of these new data sources. Also, in future research, scholars may regress alternative dependent variables than the GEM TEA rate as proxies for entrepreneurial activity. At least in Germany, other options do exist at the regional level. Second, while we have made a first step into a Big Data-based attempt to explore whether real entrepreneurial activities are covered by media news (i.e., by people who publish news about entrepreneurs and entrepreneurship), more knowledge about the precise mechanisms journalists, bloggers and other individuals employ to create this news is required. In that sense, it is important to explore the determinants affecting these individuals when they are writing the news. Contexts probably play an important role for these mechanisms, too, both from a person-related perspective and from a regional perspective. Big (media) data based upon news have the potential to better cover both kinds of contexts (but the latter one in particular) than classically collected data. Similar to other academic disciplines, entrepreneurship research in general and spatially motivated entrepreneurship research in particular will profit from the disruptive effect of new digital technologies to collect and analyse Big Data. The geographical

dimension and relevance of entrepreneurship is meanwhile widely acknowledged because it influences entrepreneurial attitudes as well as entrepreneurial success and consequently, the economic impact, output and outcome of entrepreneurship activities on economies. The regional environment is an important part of the overall context shaping entrepreneurial processes. This recent contextual turn in entrepreneurship research is obvious (see e.g. Welter, Baker and Wirsching 2019). An important issue of empirical research focussing on regional aspects, often in combination with micro-data with respect to the individual entrepreneur, is the lack of sufficiently large samples.

Our empirical research was inspired by some significant research gaps in entrepreneurship theory. Namely, the idea of regional entrepreneurial ecosystems as the rising star among theories of regional entrepreneurship suffers from adequate data sources to cover the complex and systemic relationships within such a regional system. These kinds of concepts generated in a deductive way of borrowing from innovation system literature and evolutionary economic geography require empirical tests. Primary data from surveys for these kind of tests are difficult to get, at least if they should meet criteria like statistical representativeness and interregional comparability. Another contribution to entrepreneurship theory can be expected with respect to the effects of entrepreneurial activities (as part of the regional context) on the publication behaviour of those individuals who produce big (media) data news about entrepreneurship in the region they work and live in. Also, the sender-receiver model, recently introduced to entrepreneurship research on role model effects, can be used to measure the impact of entrepreneurs as senders of signals of journalists or bloggers (writing and publishing news about regional entrepreneurship) as receivers of such signals in a given regional context. Applying news data as we have done in a very first and explorative attempt may, at least potentially, reduce some of these research gaps.

To address the potential of Big Data methods for exploring the interdependent relationship between entrepreneurship activities and media coverage, we propose the following elements as an agenda for future research: (1) Apply entrepreneurship news as a Big Data source for other countries than Germany. (2) Use other kinds of Big Data on media coverage than the one used in this paper (e.g., Pressebox). (3) test for other definitions of entrepreneurial activities (besides TEA). (4) Add a check with qualitative data to confirm some of the findings with quantitative data (interviews with entrepreneurship news producers about their perceptions of entrepreneurship in a given region); and (5) control for regional attributes like media landscape and start-up scene (size, development phase, communication behaviour and others).

3 Transnational Diaspora Entrepreneurship: A rare event measurable with new GEM data

This chapter is based on a book chapter submission to Elgar Handbook of Research on Transnational Diaspora Entrepreneurship:

von Bloh, J. (submitted 2019). Quantitative measurement of a rare event: Transnational Diaspora Entrepreneurship data through GEM methodology.

Status: under review.

Related appendices: B.1 and B.2

Abstract

Transnational Diaspora Entrepreneurship (TDE), despite being a highly relevant phenomenon in a globalized world, lacks research based on quantitative data, as there was no such data until recently. The lack of TDE data was addressed by the EU funded research project DiasporaLink from 2015 to 2019. As a result, a TDE measuring methodology was created that utilizes Global Entrepreneurship Monitor Instruments to collect data of the rare event TDE in multiple countries. The paper substantiates the relevance of TDE and outlines the new methodology by revealing newly created questionnaires targeting transnational diaspora and transnational entrepreneurs amongst “normal” entrepreneurs within a country’s population. Furthermore, a brief overview of the data collection process in 2016 is made as well as the calculation of TDE variables derived from the new questionnaire and their usability is shown.

Keywords

transnational entrepreneurship, transnational diaspora entrepreneurship, transnationalism, diaspora, diaspora entrepreneurship, migration, migrant entrepreneurship, Global Entrepreneurship Monitor, entrepreneurial ecosystem, region, spatial

3.1 Introduction

With rising volumes of worldwide migration paired with cheap as ever global communication and travel cost, entrepreneurship undergone by a highly mobile class of transnational migrants becomes more and more important. Transnational Entrepreneurship (TE) and Transnational Diaspora Entrepreneurship (TDE) are rising phenomena with many opportunities not only for the individuals but also for countries and regions (see Drori, Honig and Wright 2009; Drori, Honig and Ginsberg 2013; Chen 2009; Elo 2014; Yeung 2009). Arguably, TDE and TE might also be excellent bridges between regional entrepreneurial ecosystems of different nations (von Bloh et al. 2019). However, despite this large potential for economic impact and connection TDE seems to be underresearched when it comes to quantitative approaches (with rare exceptions like Portes, Guarnizo and Lanolt 1999). Mostly due to a lack of data there is not much information on how large this phenomenon actually is, as research on TDE, TE or so called “*New Argonauts*” (Saxenian 2006, Sternberg und Müller 2010) is mainly driven by case studies (Brzozowski, Cucculelli and Surdej 2018). While important for in depth understanding, those studies lack comparability and representativity as well as the ability to determine the actual scope of TDE activity in a country (see e.g. Henn 2012 and 2013; Bagwell 2015; Katila and Wahlbeck 2011). Until recently, there was almost no comparable quantitative data to research transnational diaspora (TD) entrepreneurs. As part of the Diaspora Link Project, a EU founded research project, co-operating with the Global Entrepreneurship Monitor (GEM) was able to fill the gap by gathering quantitative TDE data in a number of countries in 2016 and 2017.

The paper at hand is a description of the methodology, which was developed within the Diaspora Link working package two, to create a method for measuring, monitoring and evaluating TDE. The remainder of the paper is structured as follows. First, a brief section covers theory and some aspects of the TDE literature relevant to the methodology. It also derives a definition for both transnational entrepreneurship and transnational diaspora entrepreneurship. The next section briefly summarizes why TDE as a phenomenon and therefore a deeper understanding of it through high quality data is relevant. The core of the paper is the section that covers the TDE measurement methodology. Instruments, surveys and questionnaires, are shown in detail as well as variable computation through one example. Finally, some brief outcomes of the data collection are displayed for one country after which the methodology is discussed and the paper closed with a conclusion.

As with almost all entrepreneurial phenomena, there is not just one unified definition what TDE or TE is, hence „[t]ransnational immigration studies form a highly fragmented, emergent field which still lacks both a well-defined theoretical framework and analytical rigour.“ (Portes, Guarnizo and Lanolt 1999:218). A statement, which is still valid almost 20 years later despite more research being focused on the area. This is especially true when searching for reliable data to analyse the TDE phenomenon.

Hence, there is a need to define how TDE is understood in this paper. There are a few steps of adaptation before a definition is reached, which is usable as filter during the collection of quantitative empirical data, especially when capturing such a heterogeneous target group as TD entrepreneurs. As a starting point, the transnational entrepreneur is defined, followed by the specialization into the transnational diaspora entrepreneur. Later on, in the methodology section, these theoretical definitions have to be translated into a working definition for data collection. Both of the following definitions are built upon Riddle; Hrivnak and Nielsen (2010), but were refined to be broken down for data collection.

First transnationalism and diaspora are defined. As the former is quite a fuzzy concept (see Markusen 2003), the latter is defined rather narrow. In combination, transnational diaspora entrepreneurship in itself leaves room for many views and ways of interpretation. Transnationalism is defined as „*the processes by which immigrants forge and sustain multi-stranded social relations that link together their societies of origin and settlement*“ (Basch, Glick-Schiller and Blanc-Szanton 1994:7). It is, therefore, not simply the migration from A to B but rather a staying connected, importing and exporting institutions. Diaspora is an ethnic community of emigrants with contact to their country of origin (see Safran 1991). While diaspora already seems to be inherently transnational, the diaspora entrepreneur not necessarily has to have a transnational business but rather “just” might utilize the diaspora community as social capital to do business in the country of residence. Hence the transnational diaspora entrepreneur is a very specific type of transnational and diaspora entrepreneur as they are both.

Transnational Entrepreneurs are actors operating within cross-border networks (not necessarily adjacent borders) where they are shaping and exploiting economic opportunities for maximizing their resource base by committing at least one of the following economic activities at both ends of the migration corridor: Exporting, forming overseas establishments, outsourcing jobs, mobilizing business knowledge.

Transnational *diaspora* entrepreneurs are transnational entrepreneurs who also are first or second generation migrants. They leverage ethno-scapes (& possibly techno-scapes) by utilizing multiple socio-cultural resources and while doing so are mobilizing / augmenting resources from both ends of the migration corridor.

These definitions include multiple country settings as well as remigration as long as the transnational aspect is part of the equation. Furthermore, these definitions alone already imply that TD entrepreneurs both differ quite strongly from normal entrepreneurs and can potentially be a very heterogeneous group in itself (see Sequira, Carr and Rasheed 2009). Therefore, a specific methodology to cover TDE is necessary. TD entrepreneurs seem to have a higher potential of opportunity recognition as they are prone to circular migration patterns embedding them in multiple contexts or environments (Riddle, Hrivnak and Nielsen 2010). They seem to struggle more with institutional challenges (see Yeung 2002) and might be more emotionally attached to their country of origin (COO) (see Newland and Tanaka 2010) than migrants, who settled down to stay in the country of residence (COR). Despite common belief, the ethnic market seems to be not as important for diaspora entrepreneurs, as shown in Germany by Leicht and Langhauser (2014). However, as each diaspora might be vastly different from the other, generalization must not be drawn from this, especially for other countries.

3.2 Impact and Relevance

While the focus of this paper lies on the TDE measuring methodology, impact and relevance of TDE will be listed briefly. As mentioned, TDE may produce a unique form of entrepreneurs, equipped with the potential for brain circulation, being bridging agents between countries, motoric units for economic development or acting as connecting elements for entrepreneurial ecosystems of different regions or nations, to name but a few (e.g. Riddle, Hrivnak and Nielsen 2010; Newland and Tanaka 2010; Saxenian 2006; von Bloh et al. 2019). As Newland and Tanaka (2010:3-4) state, transnational entrepreneurs may foster business development, job creation, and innovation, create economic, social, and political capital through global networks and may tap into social capital through cultural and linguistic understanding. TD entrepreneurs might also act as *agents of change* (Riddle and Brinkerhoff 2011), as they import informal institutions to the COR and therefore create potential to break regional lock-ins.

The bridging capacity of transnationals, meaning the TD entrepreneurs acting purposefully or unintentionally as linking elements of distant and spatial units, often with some degree of difference in formal and informal institutions, is shown through the potential for technology transfer, building knowledge channels (similar to the global pipelines construct from Bathelt, Malmberg and Maskel (2003)), they might function as the nucleus of development COO and COR by supplying innovative or new ideas (in relation to the existing knowledgebase for the specific spatial units in which they operate). Through circular migration patterns, remigration or simultaneous embeddedness in at least two different spatial units, T and TD entrepreneurs might facilitate brain circulation (see e.g. Saxenian 2006) in contrast to the brain drain/gain effects where one nation or region is losing the other one profiteering from migration, both regions might experience economic growth stimuli.

Through interdependent embeddedness with their multiple contexts as well as their unique traits, TD entrepreneurs might possibly play an important role in entrepreneurial ecosystems in which they are active. Nevertheless, the *“the role of transnational entrepreneurs within an EES is almost completely ignored although the latter has developed to one of the most intensively debated topics in entrepreneurship research in recent years”* (von Bloh et al. 2019). First empirical analysis on this seems to hint that influence of TE on entrepreneurial ecosystems may vary with the kind of transnational entrepreneur a country attracts. The personal traits associated with TE and TDE, (e.g. such as high mobility, higher opportunity recognition, opportunity driven business foundations, rather innovative business models) are, in theory, highly valuable for the development, renewal and connection of entrepreneurial ecosystems. However, much research is needed on this part.

As the world gets evermore-globalized barriers to migration, information flow or communication fall and transnational business settings seem to become a lot more common (see e.g. Basch, Glick-Schiller and Blanc-Szanton 1994). As many recent large migration flows were induced by push rather than pull factors (i.e. MENA country outmigration), remigration after the COO is safe again can be expected and supplies a unique opportunity for COO and COR. The TDE phenomenon was never as relevant as today, which is why it should be subject to entrepreneurship research with high priority. Empirical data is needed to understand and, in the long run, structure and facilitate TDE. This paper describes a first successful attempt to resolve the lack of TDE data.

3.3 Methodology

To capture representative and reliable data of entrepreneurship phenomena with focus on specific entrepreneurial subgroups the used methodology has to be specially adapted towards the form of entrepreneurship in question. With transnational entrepreneurship and transnational diaspora entrepreneurship, a number of challenges arise when trying to identify them within a specific geographic area amongst other entrepreneurs or even amongst the total population. For an overview on the specific challenges, see e.g. Baltar and Icart (2013) or Drori, Honig and Wright (2009). TD entrepreneurs are, broadly spoken, a highly heterogeneous, spatially mobile and quite small target group to select for in a sampling approach. Despite their relevance they can still be regarded as a rare event, especially in countries, such as Germany, with relative low entrepreneurial activity to begin with, the TDE fraction is hard to capture and relative as well as absolute numbers are expected to be low. Context for and impact of TDE can differ vastly between nations (e.g. relevance of formal and informal institutions and the difference of those between country of origin and country of residence). Relationships between two countries in which the TD entrepreneur is involved might also play an important role for their business operations. Positive and negative discrimination can take place according to the image of the TD entrepreneur's ethnic group or country affiliation.

Keeping these challenges in mind, a methodology for data claiming to be representative must reflect the population statistics and demographic structure of the country. Furthermore, there is a need for an international or even global approach based on the target groups high mobility and borderless way of doing business. Therefore, the requirements for the tool used to collect quantitative TDE data are quite high and furthermore it has to be applied collectively by multiple countries at the same time with the same questionnaire to ensure comparability.

As there was an intersection between researchers involved in DiasporaLink and the Global Entrepreneurship Monitor (GEM), utilizing the GEM instruments was the logical way to go as it bares the potential to deal with the requirements and target group specific challenges quite well. The GEM is an international research consortium with vast experience in collecting and analyzing entrepreneurship specific data, dating back to 1999 with yearly population and expert surveys as well as global, national and even regional reports (see Bosma et al. 2012 for an overview on GEM methodology and instruments). With 50 or more countries participating every year, it is the largest global source for comparable data on entrepreneurial activity. Building on the GEM infrastructure, two questionnaires have been developed to collect TDE

data. Those questionnaires, aimed at population and expert surveys, were discussed with the GEM teams during the annual meeting of GEM in early 2016, as a result, refined and then pretested. Finally, a number of GEM countries adapted the surveys in 2016. Methodology, questionnaires and surveys will be shown in detail later on.

Design

The research design to analyse TDE not only quantitatively in depth in different nations but also in depth with a qualitative approach consists of two stages, with the second building upon findings of the first.

The first stage is a twofold approach, making use of GEMs proven two-sided instrumentality. It exists of a specially tailored set of questionnaires. One to be included into the adult population survey of GEM (APS), the other to be included in the national expert survey (NES). Both questionnaires and their questions and statements will receive a closer look later on.

The expert survey of GEM is asked to have a sound picture of the current state of the entrepreneurial framework conditions of the respective county. It is usually conducted as an online survey with at least 36 participants. As it is administered by every country participating in GEM, adding TDE questions aimed at expert level knowledge is a cost efficient way for high quality estimates regarding migrant entrepreneurship in general, including liability of foreignness as well as rules and regulations as barriers and remigrant policy. The aim of these questions is rather to get some insight into a broader context, which transnationals might encounter if the country of the survey is their country of residence. Context as factor may have a vast impact on the entrepreneurial in general (see e.g. Hindle 2010) which also is true for TDE were not only one but at minimum two contexts have to be navigated and acted in by the entrepreneur which also might differ quite strongly.

The adult population survey of GEM is a representative sample of a nation's population. It consists of at least $n=2000$ cases, often more. The average amount achieved by those nations, which collected TDE data in 2016, is 3648.4 cases per country. The APS is usually done as a telephone interview. This is important to keep in mind when examining the questions later on. The APS set of TDE questions is the focus point of this methodology. The aim is to identify TD entrepreneurs using a population survey approach. As this would have an insufficient cost-benefit ratio if survey costs were compared to the outcome of the actual TDE sub-sample size, including the questionnaire into the GEM APS cycle circumvents this problem. A standalone

survey is not recommended in this case. The TDE part of the APS identifies different types of TD entrepreneurs (remigrant, first and second stage migrant status) as well as also “just” transnational or immigrant entrepreneurs on two different stages of the entrepreneurial process. The first stage for which TDE data is collected is 12-month prior business foundation up to a young business age of 42 month. We call this TDE TEA. Total early-stage entrepreneurial activity (TEA) is a GEM measure for entrepreneurial activity of a given country and covers above mentioned time span. The second stage of TDE is that of established entrepreneurs, managing and owning a business, which is older than 42 month.

A secondary goal of the TDE APS questions is to identify TDE organisations as a set up point for the second stage of the methodology. This second stage is a special tailored qualitative approach targeted at the identified organisations. While the APS survey allows to estimate the amount of TDE, the scope of the phenomenon in surveyed countries, a qualitative approach towards the transnational diaspora organisations would be able to help understanding the processes and mechanisms. However, so far only the first stage has been carried out and produced data. The follow up will remain for future research.

Questionnaires

The questionnaires used in above described surveys were newly designed to create TDE specific variables for the GEM instruments. In the case of the APS, not only new TDE questions but also some original GEM variables were used to filter for entrepreneurs and calculate the TDE specific variables later on.

TDE NES

First, the NES questions will receive a closer look. They are embedded in the NES as a separate block at the end of all topic blocks and before all non-responder-related questions. Experts have to give their agreement towards the following statements on a scale from one to nine:

[TDE1]: In [COUNTRY OF SURVEY] migrants play an important role in the economy.

The first statement for experts aims at the role migrants already play in the economy of the country of survey. As this question is very broad, no specific conclusions can be drawn from it, however, based on the answers, tendencies may become visible whether new immigrants might be able to find existing structures for their economic activities or if they have to pave a new path to become active members of the country’s economic system.

[TDE2]: In [COUNTRY OF SURVEY] In-migration is perceived as economically positive.

The second TDE NES statement targets the perception with which in-migration is seen in the country. This might tell a great deal about potential barriers migrants have to overcome, e.g. if they have to deal with discrimination and antipathy in terms of a bad reputation. Again, this question is quite broad to get a general feel for the context in which transnational might have to navigate. There is no differentiation here between the low skilled manual worker and the migrant with high levels of human capital.

[TDE3]: In [COUNTRY OF SURVEY] rules and regulations for starting a business do not discriminate foreign-born entrepreneurs compared with those born in [this country].

The third statement addresses how easy immigrant entrepreneurs might do business compared to non-migrant entrepreneurs in terms of rules and regulations. This statement touches briefly on one section of liability of foreignness but also allows hints on policy emphasis regarding transnational or migrant entrepreneurship.

[TDE4]: In [COUNTRY OF SURVEY] it is easy to get access to funding as a foreign-born entrepreneur.

The fourth statement is also aimed in the direction of foreignness and ease of doing business. The focus is on how difficult it might be to get funding for starting a business.

[TDE5]: In [COUNTRY OF SURVEY] the government actively encourages [people from this country, who live abroad,] to return to [this country].

While the first four statements deal with context estimations for immigrant transnational entrepreneurs, the fifth and sixth cover the remigrant part of TDE. The fifth statement tries to evaluate whether there are government strategies to actively incentivise emigrants to migrate back to their COO. This would give an answer as to whether the government has knowledge of the economic growth potential remigrants bring back when they return.

[TDE6]: In [COUNTRY OF SURVEY] the government is actively supports entrepreneurship among [e.g. German] returning migrants.

The last statement explores if policies are in place to support entrepreneurial activity amongst returnees to make use of their bridging capabilities and increased opportunity recognition.

The TDE NES statements are constructed to be supplemental to the following TDE APS questions and are rather broad to have an overview of the context TDE encounters.

TDE APS

The core of the methodology lies within the population survey as it identifies and quantifies to which extent TDE takes place in a country and is the true novelty of this methodological approach, as there is still a severe lack of quantitative TDE data, despite the relevance of the phenomenon.

In contrast to most instruments that cover entrepreneurial activity, this definition and data, as it is based on GEM methodology, includes early stage and nascent entrepreneurs as well as established business owner-managers. This allows for a much more fine-grained picture of TDE and additionally, a separation between current TD entrepreneurial activity and just mere amount of existing TD businesses in a country. To identify the respondents to which TDE questions have to be asked, potential entrepreneurs of the above-mentioned stages have to be filtered for. Filter questions used in the GEM APS to select for potential TD entrepreneurs are listed below. If at least one of the three questions is answered with YES the set of TDE questions will be asked at a later stage within the survey.

(1) BSTART: Are you, alone or with others, currently trying to start a new business, including any self-employment or selling any goods or services to others?

A basic filter for entrepreneurial activity and part of TEA-status-computation. BSTART is asked to every individual in the APS survey and acts as a potential selector for the set of TDE questions later on. TDE is not restricted to single individuals, therefore including team business foundation efforts is fine.

(2) BJOBST: Are you, alone or with others, currently trying to start a new business or a new venture for your employer as part of your normal work?

This filter has the same logic as (1) but aims at intrapreneurship TDE. Although the focus is on entrepreneurs from filters (1) and (3), intrapreneurship is an important part of the total early-stage entrepreneurial activity of a country and therefore is included.

(3) OWNMGE: Are you, alone or with others, currently the owner of a business you help manage, self-employed, or selling any goods or services to others?

This group covers all business owner-managers regardless of business age. It can later on be separated into different stages of business development and age and is partly contributing to building the TEA variable.

Working definition

Before the APS questions can receive a closer look, first the theoretical TD entrepreneur definition has to be adapted into a usable one for empiric data collection. TD entrepreneur is, who meets both of these conditions:

First: Either is trying to found a new business on his / her own or with a team or as part of his / her job or is already a business owner-manager. The filters shown above cover this part.

Second: Has either business related ties to the COO as well as business contacts with their respective diaspora within the COR if he /she is an immigrant transnational entrepreneur or if the entrepreneur is a remigrant has business ties towards the COO of the parent who is not from the country of survey. Whether someone meets this condition, will be determined with the TDE APS questionnaire. Respondees who meet the first condition are asked the following TDE questions. Based on the answers skip logic applies and not all questions fit with every potential TD entrepreneur. For example, an immigrant transnational entrepreneur cannot be a remigrant in the country of survey. See figure 3.1. The TDE questions are inserted as a special block in the GEM APS section that is reserved for optional questions by national teams. As seen below, the empirical definitions are a lot more broad than the theoretical ones. While this comes with a loss of precision, it allows altogether getting data on this very small yet very heterogeneous target group. Together with additional GEM questions, inquiring about the business itself, later on, this sample can be sieved through for TD entrepreneurs, according to specific needs as shown later on.

TDENATIVE: Were you born in [country of survey]?

This question is to establish a crude migrant status. It helps to identify immigrant entrepreneurs as a first stage but is also necessary for the TDE questionnaire internal skip logic. Second generation migrants are covered later on. Although distinction between second-generation

migrants and endogenous entrepreneurs has to be made as they still differ in behaviour, it is the same case with first and second-generation migrants. A no in this question will skip to TDECOO. However, the complete skip logic is not displayed in the following variable and question descriptions.

TDERM: Have you lived in another country for several years and still have business related connections with that country?

If the respondents were born in the country of survey they are asked whether they are remigrants with existing business ties to the country they have lived in. This questions manage identification of remigrant transnational entrepreneurs, however, not yet remigrant transnational diaspora entrepreneurs.

TDERMO: Are you a member or beneficiary of an organization in this country [country of survey] with links to the country you have lived in?

If a remigrant transnational entrepreneur is identified, he or she is asked whether they have ties to transnational organisations. This question was introduced to set up the second stage of the methodology. If TE or TDE organisations can be identified, a follow up in depth qualitative study can then be targeted towards these organisations and their members.

TDERMOID: Could you tell me the name of the organization?

If someone is in fact in a transnational organisation and is willing to share the name, the information is collected here. TDERMOID is not asked as element of TDERMO as respondent might be willing to indicate their involvement in an organisation yet not the name.

TDECOO: In what country were you born?

Although the COO of the entrepreneur is not strictly necessary to develop TDE status, the data from this allows identifying entrepreneurship specific migration corridors between countries if a pattern shows. Furthermore, it is an important information to have an overview where the country's immigrant entrepreneurs are originating.

TDEM: Do you have business related connections with your country of origin?

Same intention as TDERM, yet aimed at immigrant entrepreneurs to identify whether they are transnational entrepreneurs.

TDEMO: Are you a member or beneficiary of an organization in this country [country of survey] with links to your country of origin?

This question covers the same ground as TDERMO yet for immigrant transnationals.

TDEMOID: Could you tell me the name of the organization?

This question covers the same ground as TDERMOID yet for immigrant transnationals.

TDEDIAS: Are you actively in contact for business related purposes with people from your country of origin who also live in [country of survey]?

This question finally addresses diaspora involvement of the respondent. It identifies immigrant TD entrepreneurs.

TDE2MQ: Were either of your parents born outside of [country of survey]?

Regardless of migration status so far, respondents are asked whether they are second generation migrants, as those can become TD entrepreneurs as well. If both parents are born in the country of survey the TDE question part of the APS ends with TDE2MQ.

TDE2M: Do any of your business operations benefit from contacts in your parent's country of birth, that you have just told me was not (country of survey)?

After second generation migrant status is established TDE2M can identify transnational entrepreneurship status.

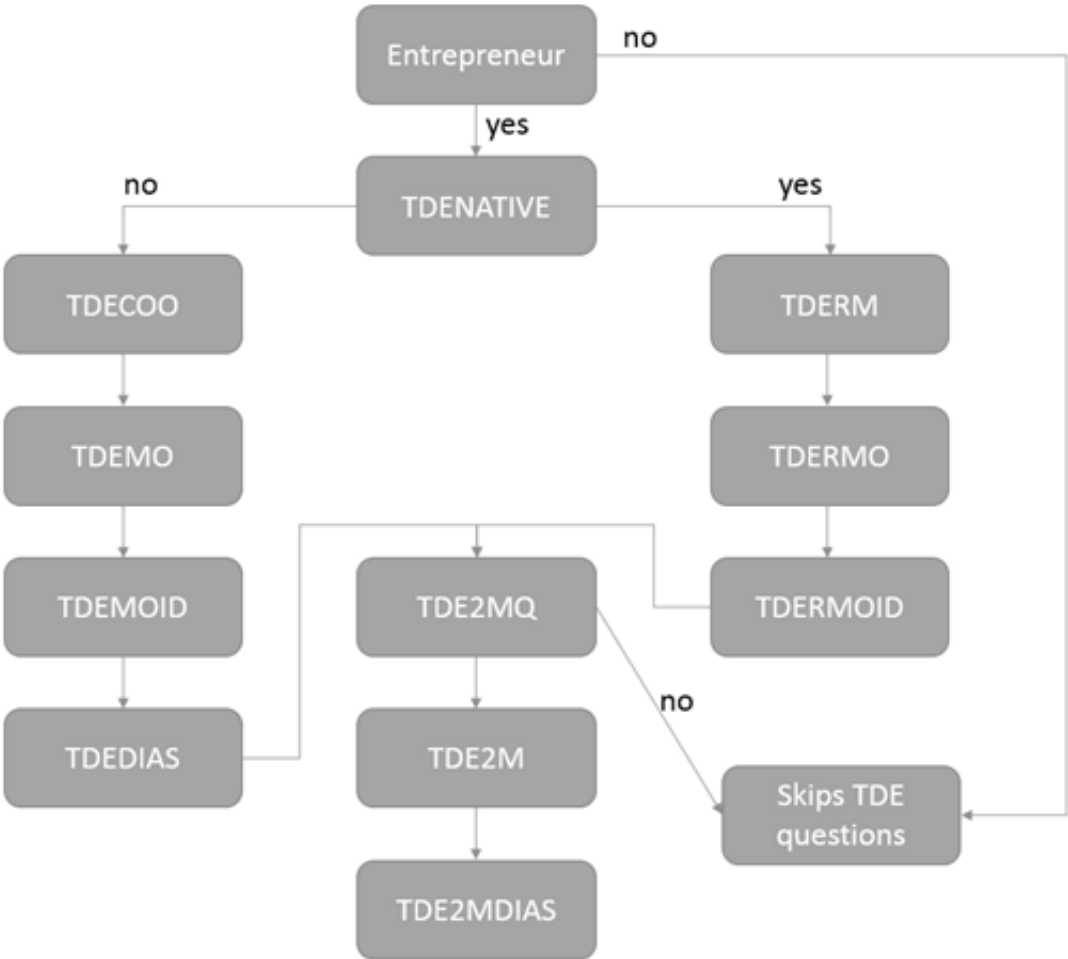
TDE2MDIAS: Do you have active business ties with someone living in [country of survey] who also is originally from the country of birth of your parent that was not born in [country of survey]?

Finally, this question can identify second-generation transnational diaspora entrepreneurs as it covers diaspora involvement of the responding entrepreneur.

Major skip logic

To understand the major skip logic between the questions consult fig.3.1, which shows the main flow during the survey. The minor skips related to “don’t knows” or any discontinuation of one line of questioning is not depicted.

Figure 3.1: TDE APS skip logic summary



3.4 Data collection

After a pretest of the TDE APS questionnaire, the main data collection cycle with most countries participating took place in 2016. In 2017, some countries, including Germany, continued to collect the TDE variables included in the APS. This was especially necessary in Germany due to TDE being an extremely rare event and led to the opportunity to pool data from multiple years for analysis (e.g. as done in von Bloh et al. 2019).

The 2016 data collection took place between May and August in at least the following countries: Germany, United Kingdom, Luxembourg, Poland, Croatia, Georgia, Chile, Jamaica, Mexico and Puerto Rico. Analysis of the data outcome is not part of this work. In the result section, some brief descriptives will show that the methodology works as designed.

Calculating TDE⁴

After data collection and harmonization through the GEM data team, the TDE variables and shares can be calculated using above stated questions and some standard GEM variables. Calculation is now showcased using the example of TDE in TEA stage.

With: 1='Yes'; 0='No'; -1='Dont Know'; -2='Refused'; |=OR (as either one or both); & = AND

TEA = 1 means a respondent is either a nascent entrepreneur or an owner manager of a business up to 42 month old.

First: Compute first generation transnational diaspora immigrant TEA entrepreneurs:
TND1TEA

IF (TDEDIAS = 2 | TDEM =2) & TEA = 1 THEN TND1TEA = 0.
IF TDEDIAS = 1 & TDEM = 1 & TEA = 1 THEN TND1TEA = 1.
IF (TDEDIAS = -1 | TDEM = -1) & TEA = 1 THEN TND1TEA = -1.
IF (TDEDIAS = -2 | TDEM = -2) & TEA = 1 THEN TND1TEA = -2.

Second: Compute second generation transnational diaspora immigrant TEA entrepreneurs:
TND2TEA

IF (TDE2MDIAS = 2 | TDE2M =2) & TEA = 1 THEN TND2TEA = 0.
IF TDE2MDIAS = 1 & TDE2M = 1 & TEA = 1 THEN TND2TEA = 1.
IF (TDE2MDIAS = -1 | TDE2M = -1) & TEA = 1 THEN TND2TEA = -1.
IF (TDE2MDIAS = -2 | TDE2M = -2) & TEA = 1 THEN TND2TEA = -2.

Finally: Calculate TDE TEA status for first and second generation immigrant TD entrepreneurs:

TNDTEA

IF TND1TEA = -2 | TND2TEA = -2 TNDTEA = -2.
IF TND1TEA = -1 | TND2TEA = -1 TNDTEA = -1.
IF TND1TEA = 1 | TND2TEA = 1 TNDTEA = 1.

Using this way of calculation a number of new variables could be calculated for analysis, isolating very specific target groups. To show the potential of the methodology, a number of differentiated groups of entrepreneurs are listed below.

Immigrant Nascent Entrepreneur

Immigrant New Business Owner-Manager

Immigrant TEA Entrepreneur

⁴ Much gratitude to Jonathan Levie who built most parts of the syntax to compute GEM TDE variables in 2016.

Immigrant Established Business Owner-Manager
 Immigrant owner of running business (no nascent) incl agriculture
 Returned Migrant Nascent Entrepreneur
 Returned Migrant New Business Owner-Manager
 Returned Migrant TEA Entrepreneur
 Returned Migrant Established Business Owner-Manager
 Transnational Immigrant Nascent Entrepreneur
 Transnational Immigrant New Business Owner-Manager
 Transnational Immigrant TEA Entrepreneur
 Transnational Immigrant Established Business Owner-Manager
 Transnational Immigrant Nascent Entrepreneur with diaspora organisation links
 Transnational Immigrant New Business Owner-Manager with diaspora organisation links
 Transnational Immigrant TEA Entrepreneur with diaspora organisation links
 Transnational Immigrant Established Business Owner-Manager with diaspora organisation links
 1st generation Transnational Diaspora Immigrant Nascent Entrepreneur
 1st generation Transnational Diaspora Immigrant Established Business Owner-Manager
 2nd generation Transnational Diaspora Immigrant New Business Owner-Manager
 2nd generation Transnational Immigrant Established Business Owner-Manager

3.5 Results and Discussion

The previous section described a new methodology to collect quantitative empirical data on transnational and transnational diaspora entrepreneurship. The new questionnaires have been applied to the field in at least ten different countries during at least one or more GEM data collection cycles as parts of the adult population and national expert surveys. The key challenges for quantitative empirical data on TE and TDE is the rarity and high mobility. The specific and small target group shows itself in the identified shares of T and TD entrepreneurs amongst “normal” entrepreneurs, both early stage and established. As an example, see the share of TDE in total early-stage entrepreneurial activity in table 1. The choice of countries is arbitrary at this stage.

Table 3.1: TDE share of TEA

	GERMANY	UK	CHILE	MEXICO	CROATIA
TEA2016	4.6	5.2	24.2	9.6	8.4
TDE in %TEA2016	5.5	4.4	1.4	1.2	4.5

The case of Germany in table 3.1 shows, as just one example, the rarity of the TDE event in entrepreneurial activity. While only 4.56% of the German population are active in TEA to begin with, only 5.5% of those 4.56% are TD entrepreneurs (excluding established owner-managers of mature businesses who would roughly double the absolute amount).

Making use of the GEM instruments for data gathering has proven as a functional and fruitful decision. The list of separable types of migrant entrepreneurs shows the huge research potential of this dataset. Complemented with standard GEM variables, such as firm type, growth aspiration, demographics and educational background as well as business foundation motive or even fear of failure a broad array of analysis is opened up.

The TDE APS questionnaire has proven very valuable, the TDE NES questions however, lack behind. Although the data shows some general information on the national context for migrant entrepreneurs, may they be immigrant or remigrant, they do not contain the specificity of the quantitative data from actual TD entrepreneurs. Furthermore, with partially high standard deviation in the TDE NES variables (at least in Germany) this data has to be used and interpreted with care.

While the methodology has originally been designed as a two-staged approach, only the quantitative part has been conducted so far. However, as the lack of quantitative data was the main driver for developing the new approach and quite a few case studies are already out there, the second stage might not necessarily be essential. Furthermore, the GEM APS might not have been the ideal instrument to collect actual names of TDE organisations as not many transnational and or diaspora organisations were identified or respondents were unwilling to share this information which has led to a current discontinuation of the second stage.

3.6 Conclusion

Transnational diaspora entrepreneurship is an extremely rare event. The data collected with the methodology explained in this paper was able to show this. The relevance and scope of TDE or at least TE will likely increase drastically in the future as refugee remigration takes place and the death of distance progresses as a result of decreased transportation cost and time, lower communication costs and travel time. All forms of migrant entrepreneurship will have to take a front seat in research, not only to counter prejudice in this time of rising nationality but to develop scientifically rooted policy recommendations to create the most beneficial outcomes for all involved parties. One key factor, amongst qualitative research, is empirical data to analyse phenomena such as TDE and evaluate them regarding scope and relevance. The methodology developed during the DiasporaLink project and shown in this paper delivers such data as a collective effort of researchers from the Global Entrepreneurship Monitor and its national teams who supported this project.

Future research should utilize the valuable data set created using the methodology from this paper. As there are now up to three years of TDE data for some countries reliability is increasing as well.

Apart from this, one stream of research that should be pursued in the near future is to shed more light on the interdependency of transnational entrepreneurship and entrepreneurial ecosystems. Similar to the TDE approach using GEM to gather quantitative data not present before, an approach has been made to create an entrepreneurial ecosystem composite index (ESI) (see Sternberg, von Bloh and Coduras 2019). One major difference to the TDE data at hand is the spatial scale, which is a subnational one in contrast to the national scale of this paper. An introduction of the TE subject into ESI methodology might yield results for innovative research how different types of entrepreneurs contribute to ecosystems.

4 Transnational Entrepreneurs: Opportunity or Necessity driven?

This chapter is based on:

von Bloh, J.; Mandakovic, V.; Apablaza, M.; Amorós, J.E.; Sternberg, R. 2020. Transnational entrepreneurs: opportunity or necessity driven? Empirical evidence from two dynamic economies from Latin America and Europe. *Journal of Ethnic and Migration Studies* 46(10): 2008-2026. DOI: 10.1080/1369183X.2018.1559996.

Related appendix: C

Abstract

Transnational Entrepreneurship (TE) is an increasingly important phenomenon, symptomatic for a globalized world with a large extent of migrants and interchanges between their countries of origin and of residence. Our article deploys a unique data set which compares TE for two different national contexts and institutional settings: Chile and Germany. Using data from the 2016 and 2017 Adult Populations Surveys (APS) of the Global Entrepreneurship Monitor (GEM) project from both countries, we relate the probability of being an opportunity driven entrepreneur with the condition of being a transnational entrepreneur. Part of these data sets are specific variables on transnational entrepreneurship developed in the EU funded, current DiasporaLink research project.

Our findings suggest that varying institutional settings attract or form different types of TE. While Chile seems to attract mainly opportunity driven TE, the TE in Germany reveals strong evidence of necessity driven TE. In addition, we explore different traits on the probability of being involved in TE based on the presumption that transnational entrepreneurs show signs of higher opportunity recognition and network embeddedness and can thereby be a major driver of entrepreneurial ecosystems as well as act as linkages between different national systems.

Keywords

Transnational Entrepreneurship, Entrepreneurial Ecosystem, Chile, Germany, Opportunity Driven, Global Entrepreneurship Monitor, Institutions

4.1 Introduction

Transnational Entrepreneurship (TE) is an increasingly important phenomenon, symptomatic for a globalized world with a large extent of migrants and interchanges between their countries of origin and of residence. Since Saxenian's (2006) seminal case study on “*New Argonauts*”, TE receives a lot of attention from researchers and policy makers. TE is now associated with huge economic development potentials for both countries of origin and host countries, spurred by visions of establishing a Silicon Valley of their own by creating or supporting TE, based on a “class” of highly mobile and embedded re-migrant transnational (diaspora) entrepreneurs. However, there is still a lack of comparable research with a certain kind of “*analytical rigor*” as stated by Portes, Guarnizo, and Landolt (1999:218; see also Drori, Honig, and Wright. 2009). Despite the lack of empirical data, TE will gain in relevance for entrepreneurship support policies in host countries. Those host countries are characterized by very different institutional and other framework conditions and most of them provide better economic conditions than the migrants’ home countries.

Another very relevant topic of entrepreneurship research is Entrepreneurial Eco-Systems (EES; see Sorenson 2017; Alvedalen and Boschma 2017). EES looks at entrepreneurship within a given spatial territory as a system with interdependently linked actors and organisations intertwined with a context of formal and informal institutions influencing entrepreneurial activity. EES, although a very recent, empirically virtually unproven concept, are gaining almost worldwide acceptance among practitioners, in a similar fashion to previous supposed panacea of economic policy strategies, such as the cluster approach in the 1990s or the creative industries concept since the early 2000s. While there are good reasons for applying the EES concept mainly on the sub-national level of (city) regions (see Malecki 2018), the basic idea has also relevance for the national level, i.e. when comparing countries to each other (see Acs, Autio, and Szerb 2014).

Surprisingly enough, the role of transnational entrepreneurs within an EES is almost completely ignored although the latter has developed to one of the most intensively debated topics in entrepreneurship research in recent years. This leaves the link between TE and EES unexplored and opens up an important research gap. While some EES scholars stress the relevance of (ethnic) diversity (Stangler and Bell-Masterson 2015) as an important success factor of an EES, the role of TE has not yet been studied, neither from a conceptual nor from an empirical perspective. The empirical part of our article is focused on the two main motives to start a firm:

recognizing an opportunity to start a firm or a lack of alternative employment options. Opportunity entrepreneurship is related to growth potentials of young firms, not just because their founders more often have the competencies, the capacities, and the will to grow than founders who start the firm mainly because of having no other choice to earn their own living. Consequently, if policymakers intend to revitalize their national or sub-national economies by supporting new firms they search for opportunity entrepreneurship, and less so for necessity entrepreneurship. It is not a surprise, therefore, that the EES concept is dedicated to "*ambitious*" entrepreneurship (Stam and Spigel 2018), i.e. young entrepreneurs who want to grow, who are able to grow and who intend to develop innovative products or services. We argue that transnational entrepreneurs, different from migrant entrepreneurs in general, are more driven by opportunity motivations than by necessity motivations, meaning that transnational entrepreneurs would be relevant actors in a national EES. National EES, however, do differ between countries, and they exert country-specific influences on transnational entrepreneurs. Thus, it is useful to test our idea in two countries with many similarities, but also some differences regarding their national EES. Until recently, no comparable empirical data was available to analyse TE on a global scale. As part of the EU funded research project "DiasporaLink", researchers associated with the Global Entrepreneurship Monitor (GEM) developed a unique set of questions to capture TE and included them into many GEM national team's adult population and national expert surveys in 2016 and 2017. Two of those countries are presented and compared in this article: Chile and Germany.

Our research intends to contribute to the TE and EES literature in two ways: We expect that, among other traits, (1) transnational entrepreneurs have a higher probability of engaging in opportunity based entrepreneurial activities with higher growth expectations, and that this probability differs between both countries based on contextual peculiarities, i.e. ecosystem conditions. We hypothesize that the more enabling entrepreneurial environment in Chile will create more, and more successful policy instruments to support TE in Chile than in Germany. Additionally, (2), we intend to explore the relationship between country embedded TE and entrepreneurial ecosystems. We suggest that transnational entrepreneurs are the "right kind of entrepreneurs" with personal ties to different countries and, acting as potential bridging agents, such entrepreneurs could connect ecosystems across the globe, which would allow them to play a crucial role in keeping EES vital and progressing. They can do this by supplying role models and contacts for local entrepreneurs to internationalize and by providing an inflow of new knowledge and routines from other EES. But also through having a unique opportunity

recognition which helps the EES in a variety of ways, such as: Maximizing its potency by pushing opportunity driven entrepreneurship, enhancing the social capital of both EES by connecting their actors with each other and by inducing positive development in both EES. We argue that transnational entrepreneurs can fit this role because they can perceive more opportunities for start-ups and have a higher embeddedness into entrepreneurship networks (i.e. they have more contacts).

The majority of the literature on TE is dominated by qualitative case studies that are necessary for in depth understanding (Brzozowski, Cucculelli and Surdej 2018), we want, however, contribute to increasing the number of quantitative empirical studies, which there is a lack of.

The remainder of the article is structured as follows: Section 4.2 addresses the differences and commonalities of the institutional and economic national contexts of Chile and Germany. In section 4.3, we look at the theoretical background of the applied concepts. We then pursue the empirical part by relating the probability of being an opportunity driven entrepreneur with the condition of being a transnational entrepreneur for both countries in section 4.4 after which we compare two different national contexts in terms of entrepreneurship (section 4.5). The final section 4.6 will cover our findings, critical remarks and insight into further research.

4.2 Comparing national entrepreneurial Contexts: Chile and Germany

Despite the socio-political and economic problems of the last ten years, many countries in Latin America have been able to create political stability and growth during the last three decades (IABD, 2017). This has been followed by trade openness and better global integration, leading to a new environment which fosters an emerging social global class in the region and particularly in Chile: transnational entrepreneurs. In Germany, too, the economic and the political situation is rather stable during the recent decades. The economy performed quite well, with low unemployment rates and modest but steady GDP growth rates (see ec.europa.eu/eurostat), even during the global financial and economic crisis of 2007/2008. Another parallel of both countries is the heavily increased immigration in recent years which poses both challenge and opportunity. Differences between both countries are the deepness of the social welfare system and unemployment benefits. While in Chile people have to rely on family and friends to seek a job, in Germany exists a government agency handling unemployment benefits and the search for employment. Long term unemployed are also

supported by the state to keep a minimum standard of living. While this social security net keeps people away from critical situations where their lives are at stake, it might reduce the incentives to become self-employed along the way.

Following the assessment of the World Economic Forum (WEF), Chile is listed as efficiency driven and Germany as innovation driven economy. While we argue that both countries are comparable in many ways, there is a gap in economic development, with Germany's economy mostly driven by human capital, knowledge and innovation, and Chile's economy by more efficient and comparative productions as well as resource mining and export. The national socioeconomic and cultural context influences how entrepreneurial activities and attitudes are formed and take place. Between both countries, both similarities and significant differences in terms of entrepreneurial attitude, culture and climate are observable. If Chile and Germany are compared with the recently developed Entrepreneurial Spirit index of GEM (GESI), this becomes especially visible. The GESI consists of three GEM questions: *“First, whether the respondent knows someone who has started a business in the past year (entrepreneurial awareness). Second, whether the respondent thinks there are good opportunities for starting a business in their local area (entrepreneurial opportunity perception). Third, whether the respondent thinks they have the knowledge, skills, and experience to start a business (entrepreneurial self-efficacy).”* (GERA 2018:29). Chile ranks 10th in comparison with 54 countries which are listed in the most recent GEM Global Report. Germany is far back on rank 37. And while media coverage of entrepreneurship and the view on whether entrepreneurship is a good career choice are quite similar for both countries, the overall reputation of entrepreneurs shows noticeable differences. The social status of entrepreneurs in general is lower in Germany. The differences in entrepreneurial spirit and climate, amongst other socio-economic factors, results in diverging levels of entrepreneurial activity. While Chile is characterized by high start-up rates, Germany has one of the lowest total early stage entrepreneurial activity rates (TEA), meaning nascent entrepreneurship and new business up to the age of 42 months. If compared to TEA rates of all other GEM countries, oblivious of the level of development, Germany ranks 48th of 54 countries while Chile comes in 5th. For a long time, in Germany TE has neither been an important empirical phenomenon nor has it been the object of government policies. Both has changed in recent years, partially related to the proposed relationship between significantly increased in-migration, assumed increase of start-up rate, and policy responses in terms of specific means to steer migration, (migrant) entrepreneurship and TE. While Germany seems to be the destination of migration more or less

involuntarily, the Chilean Government actively tried to attract foreign entrepreneurs with various programs.

Both entrepreneurial climate and activity hint at significant differences in the configuration of the national entrepreneurial ecosystem. In light of this institutional variance between Germany and Chile, we expect to see differing types of transnational entrepreneurs in both countries.

4.3 Theoretical Framework

4.3.1 Transnational Entrepreneurship

Transnational entrepreneurship is a complex phenomenon that has different shapes and sizes (Bagwell, 2015). Since the conceptualization of transnationalism related with “*the process by which immigrants forge and sustain multi-stranded social relations that link together their societies of origin and settlement, and through which they create transnational social fields that cross-national borders*” (Basch, Glick Schiller and Szanton-Blanc 1994:6), there are different attempts to delimitate what is (or is not) a transnational phenomenon. Portes, Guarnizo, and Landolt (1999) and Portes, Guarnizo, and Haller (2002) argue that the concept is restricted to circumstances in which travels that imply cross-border connections are extensive, regular and resilient.

Wong and Ng (2002) relate the concept with the ethnic economy which involves both operational components and the transmigration of the owners. These enterprises are socially embedded in both their home and host countries, potentially providing them with access to networks and resources in both entrepreneurial environments. Some other efforts are in the direction to define typologies for translational entrepreneurs (Landolt, Autler, and Baires 1999; Rusinovic, 2008; Bagwell, 2015; Elo, 2016) that put emphasis on the transnational involvements but also the degree and the extent of transnational inputs and activities in the business.

More recently, transnational entrepreneurship seems to be a phenomenon which is not only growing in scale but also in relevance. It is closely connected to globalization, decreasing barriers for migration and trade or modern fast ways for communication and travel (see Riddle, Hrivnak, and Nielsen 2010).

The so-called brain drain was long thought of as the inevitable negative result when developing countries invested in education to increase human capital which then would migrate to more advanced countries. The view on this changed on this in the last 10-15 years (see Saxenian 2006). In several cases emigrants came back as return migrants, equipped with a plethora of experience, (technological) know how, know who, personal and professional networks and formed by the informal institutions of the host country, leading to reverse brain drain or even brain circulation in form of continued transnational business ties. If transnationals found new businesses based upon this unique mix of skills and their embeddedness in two different national contexts they could become important motoric units for economic development and the exchange of new knowledge for their country of origin. This effect could even multiply if the transnational entrepreneurs act as role models for coming generations of entrepreneurs. But even if no permanent remigration takes place, transnational entrepreneurs can establish corridors for knowledge flows between both country of origin and stay by traveling back and forth or frequent communication (see Saxenian 2006, 2008).

Based on this “*development link between both countries*”, (European Commission 2014), Brzozowski, Cucculelli, and Surdej (2014) state that home country conditions have not been thoroughly reviewed. They were able to show that institutional peculiarities as well as socio-economic contexts of the country of origin impact transnational connections of migrant entrepreneurs (see Brzozowski, Cucculelli, and Surdej 2014). This relates closely to the findings of Yip (2011), that policies aimed at supporting immigrants are highly heterogeneous between countries. However, TE has many forms.

Sequiera, Carr, and Rasheed (2009:1038) build a typology for different kinds of transnational enterprises, showing that “*even among transnational enterprises, there is considerable heterogeneity*” in terms of how their transnationalism shows (frequent travelling vs. usage of modern media to keep close contact or a mixture of both), where they conduct which business, the degree of innovation, whether actual products move across borders or rather a flow of ideas and so forth. A fact that had to be mirrored when designing the TE questions for data gathering. Additionally, in their case study of the incubator IntEnt in the Netherlands, Riddle, Hrivnak, and Nielsen (2010) found evidence, that transnational entrepreneurs show cyclic migratory patterns which led to increased opportunities for starting up a new business, leading to the hypothesis, that transnational entrepreneurs have a higher opportunity recognition than non-transnational entrepreneurs.

For this article we adopted the definition which was used as foundation of creating the TE questions for the GEM surveys: Transnational entrepreneurs are operating within cross-border networks shaping and exploiting economic opportunities by maximizing their resource base by committing at least one of the following economic activities at both ends of the migration corridor: Exporting, forming overseas establishments, outsourcing jobs, mobilizing business knowledge. The definition also includes remigration as well as cyclic migration. However, we focus on transnational entrepreneurs which are embedded in two countries. We explicitly exclude the type of transnational entrepreneur that purely exports or has a simple supplier relation with some other party in another country. The operationalization of this will be covered in section 4.4.

4.3.2 Entrepreneurship Motivations

Numerous academic studies highlight the importance of the determinants of different types of entrepreneurship. According the Global Entrepreneurship Monitor framework among others (Alvarez and Barney 2013; Reynolds et al. 2005; Valdez and Richardson 2013) there are two different main types of entrepreneurial motivations: opportunity and necessity-based entrepreneurial actions. A differentiation between both types of entrepreneurship is necessary because they are considerably different in their economic impact as well as dependence on factors, both individual and contextual (see Wong, Ho, and Autio 2005; McMullen, Bagby, and Palich 2008 or Valliere and Peterson 2009). Opportunity-based entrepreneurship (OPP) covers entrepreneurial activities started voluntarily in order to gain more income or independence. In the other hand, necessity-based entrepreneurial activity (NEC) is the creation of a new business out of need, when no other appropriate employment is available to the individual in the formal job market (Bosma et al. 2008; Reynolds et al. 2005).

Because of the potential relevance of entrepreneurship in social and economic development, a lot of research mainly puts special focus on opportunity-based entrepreneurship (Acs 2006; Bowen and De Clercq 2008; Levie and Autio 2011). But in less develop economies, necessity-based entrepreneurship is very important since it is a source of income for individuals excluded from the formal labour market (Amorós et al. 2019).

4.3.3 Transnational Entrepreneurship, Motivations and Opportunity

From the perspective of transnational entrepreneurship, motivations could be linked with the propensity to be engaged in new business creation. Among different factors that could determine the motives behind these entrepreneurial endeavours, one of the most relevant is the diversity related with (in-) migrants groups (Brzozowski, Cucculelli, and Surdej 2018; Kloosterman, Rusinovic and Yeboah 2016; Sepulveda, Syrett, and Lyon 2011). Diversity includes “*a wide variety of political refugees, asylum seekers, and ‘economic’ migrants from a large number of both developed and less-developed countries, [that] is much more diverse*” (Kloosterman, Rusinovic, and Yeboah 2016:914). The diversity is more accentuated in the last two decades. It is not the same being a refugee that starts a new (informal) business out of necessity than an immigrant looking for a genuine business opportunity in a more sophisticated and developed market that maintains strong relationships with the country of origin. We are not arguing that opportunity driven entrepreneurs (OPP) have pre-eminence over necessity driven entrepreneurs (NEC), because the social and economic relationships between these types of entrepreneurship activities are more complex than the simple dichotomy (Amorós et al. 2019; McMullen, Bagby, and Palich 2008), but highlights that motivations could be dynamics and interconnected with the contexts.

The process of transnationalism could be related with elements that enhance OPP compared with NEC. First, transnational entrepreneurs potentially have access to an extended range of social capital (Bagwell 2015; Simba and Ojong 2018). This social capital is complemented with different types of capital that could include cultural and human capital (multilingualism, international management experience, knowledge of overseas markets) and economic capital (different sources of funding or access to multiple national financial systems). Second, transnational entrepreneurs could be linked to strong networks. Networks help to maintain contacts, relatives or family in the country of origin in whom one can trust and/or do business with, providing access to new markets and increase sales (Dimitratos et al. 2016; Kariv et al. 2009; Rusinovic 2008). Networks facilitate the international movement of people, money and ideas, encouraging also “knowledge transfer” contributing to business innovation (Coe and Bunnell 2001). Finally, related with knowledge, transnational entrepreneurs, because of their involvement and engagements in different cultural and economics settings, could be more exposed to better opportunity recognition. This is related with needed experience, skills, know-how, access to technology, and also the socio-cultural awareness (Brzozowski, Cucculelli and Surdej 2018).

The above stated traits of transnational entrepreneurs make them into EES actors with high potential for driving roles based on their opportunity recognition, social capital and openness as well as enabling them to link EES (see Fraiberg 2017 for a case study). Transnational entrepreneurs are accustomed to at least two different institutional environments, sharpening their awareness and ability to find their way to foster their new businesses. Although the main focus of this article is not on EES, we argue that transnational entrepreneurs can play an important role as bridging agents not only between countries or regions but between distinct entrepreneurial systems in which they are embedded in home and host country, acting as pipelines by potentially enhancing flows of knowledge, ideas and informal institutions creating more opportunities for start-ups in both countries.

Although we have national level data and a national focus, we argue that the EES transnational entrepreneurs are embedded in, are a regional rather than national scale phenomenon. Thus, we cannot measure direct impact of transnational entrepreneurs on their EES just yet. We briefly define our understanding of an EES as a geographically located interlinked system of conditions and components which both influence entrepreneurial activities and are also influenced by it. The conditions cover context factors such as culture, formal and informal institutions, availability of financial capital but also the existence of highly active networks consisting of EES actors and support structures amongst others. Components are actors and organizations (Stam and Spigel 2018).

Considering the differences in national EES, entrepreneurial climate and activity between Chile and Germany, we abstain from testable hypotheses and turn towards a couple of explorative statements deriving from the research questions whether being a transnational entrepreneur affects the entrepreneurial motive and whether the traits assigned to transnational entrepreneurs through case studies and theory can be shown for Chile and Germany.

We estimate that being a transnational entrepreneur has a significant impact on the motivation why someone is an entrepreneur.

- (1) We expect TE to have an overall positive influence on opportunity driven entrepreneurship.
- (2) And an overall negative impact on necessity driven entrepreneurship.
- (3) However, we expect to see major differences between the impact of the transnational entrepreneur status between both countries based on their institutional settings and stage of economic development.

(4) Lastly we expect that the probability of someone being a transnational entrepreneur is higher for persons with a high degree of network embeddedness or entrepreneurial awareness and opportunity recognition.

4.4 Data, Methodology and Results

4.4.1 Data and Methodology

We use data from the Global Entrepreneurship Monitor (GEM) Adult Population Survey (APS). The GEM collects comparable data on the entrepreneurial activity, attitudes and aspirations of individuals in about 60 countries worldwide. GEM data not only identifies the early stage entrepreneur but also classifies the motives of their entrepreneurial activities as opportunity and necessity driven new ventures. GEM usually does not collect data on transnational entrepreneurship, however, a number of GEM members of the national teams from the UK, Chile and Germany that have been involved into a EU funded project fostering mobility of researchers, DiasporaLink, developed and proposed a set of questions for the 2016 GEM APS to measure TE and TDE (transnational diaspora entrepreneurship). These questions were adopted by several other countries.

Table 4.1 shows an overview of the data set description. See Annex C for a variable description. While both samples border at around 8000 cases (3301 entrepreneurs), the amount of entrepreneurs varies significantly with Chile having roughly 2,5-times the amount of entrepreneurs. With TE being a rare event, instead of just GEM TEA, also owner-managers of established businesses have been included in the class of “entrepreneur”.

In line with the above stated definition, a transnational entrepreneur is an entrepreneur that either has lived in another country for several years before returning to his or her country of origin and still has business relations with that country or immigrants that still have business related connections with the country of origin. To establish this in the data set we utilized two variables of the GEM APS TDE set: “Have you lived in another country for several years and still have business related connections with that country” and “Do you have business related connections with your country of origin?”. We do not include second generation transnational entrepreneurs because we believe that both groups, 1st and 2nd generation transnational entrepreneurs, show significant differences when it comes to the influences of the involved countries.

Table 4.1: Descriptive Statistics from Chile and Germany

	Chile			Germany			Total		
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
Opportunity driven entrepreneur (OPP)	2344	49.1%	0.594	957	47.6%	0.345	3301	49.9%	0.529
Necessity driven entrepreneur (NEC)	2344	37.7%	0.172	957	26.4%	0.075	3301	35.4%	0.147
Age	2344	40.88	12.07	957	44.68	11.50	3301	41.86	12.04
Female	2344	49.1%	0.404	957	47.0%	0.329	3301	48.7%	0.384
Tertiary Education	2344	49.6%	0.438	957	47.7%	0.349	3301	49.3%	0.415
Knows an Entrepreneur	2344	49.0%	0.600	957	49.9%	0.541	3301	49.3%	0.585
Opportunity Recognition	2344	49.9%	0.536	957	48.5%	0.621	3301	49.7%	0.558
Self-Efficacy	2344	34.6%	0.861	957	34.9%	0.858	3301	34.7%	0.860
Fear of Failure	2344	41.6%	0.222	957	38.0%	0.175	3301	40.7%	0.210
Transnationals	2344	21.7%	0.050	957	27.2%	0.080	3301	23.3%	0.058

We use a probit regression model due to the structure of the dependant variable. It estimates the probability for an individual to engage in opportunity or necessity entrepreneurial activity, using TE as the main explicative variable, including, individual level controls that explain the probability of engaging in entrepreneurial activity such as age, gender and education and other controls regarding self-perception of individuals about entrepreneurship. We use interactions in order to capture enhancing or attenuating effects of the traditional entrepreneurial traits.

4.4.2 Results

To address the research statements (1) and (2) the influence of being a transnational entrepreneur on being opportunity driven or necessity driven was estimated for a data set consisting of the pooled data from both countries (N=3031). We argue that this shows overall behaviour of TE regarding opportunity driven entrepreneurship despite the mentioned institutional differences (which are addressed by a country dummy). At pool level estimation, we observe that the transnationals in Germany are less likely than in Chile to engage in any kind of entrepreneurial activity, necessity ($\beta=-0.58$; $p<0.001$) and opportunity driven ($\beta=-0.49$; $p<0.001$). When interacting the Germany-Dummy with TE, we find that being German decreases the positive effect TE has on opportunity driven entrepreneurship and the negative effect of TE on necessity driven entrepreneurship turns positive, meaning that TE in Germany are more likely to be necessity driven oriented while in Chile they are opportunity drive oriented. To shed light on research statement (3) each country was additionally looked upon separately in the next two sub-sections and compared with each other in section 4.5.

Table 4.2: Pooled Data Probit Model Regression

	<i>Pooled Data</i>			
	<i>Opp</i>	<i>Nec</i>	<i>Opp</i>	<i>Nec</i>
Transnational	0.23*	-0.10	0.41**	-0.54**
	(0.10)	(0.14)	(0.14)	(0.20)
Tertiary Education	0.35***	-0.36***	0.35***	-0.35***
	(0.05)	(0.06)	(0.05)	(0.06)
Female	-0.12*	0.22***	-0.11*	0.22***
	(0.05)	(0.06)	(0.05)	(0.06)
Age	-0.02	0.03	-0.02	0.03
	(0.01)	(0.02)	(0.01)	(0.02)
Age Squared	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Knows an Entrepreneur	0.23***	-0.13*	0.24***	-0.13*
	(0.05)	(0.06)	(0.05)	(0.06)
Opportunity Recognition	0.26***	-0.15*	0.26***	-0.16**
	(0.05)	(0.06)	(0.05)	(0.06)
Self-Efficacy	-0.17*	-0.10	-0.17*	-0.09
	(0.07)	(0.08)	(0.07)	(0.08)
Fear of Failure	-0.10	0.03	-0.10	0.02
	(0.06)	(0.07)	(0.06)	(0.07)
Germany	-0.58***	-0.49***	-0.55***	-0.57***
	(0.06)	(0.07)	(0.06)	(0.08)
Germany#Transnational			-0.47*	1.12***
			(0.22)	(0.28)
Constant	1.12***	-1.13***	1.12***	-1.15***
	(0.29)	(0.33)	(0.29)	(0.34)
Pseudo R-squared	0.138	0.050	0.140	0.056
Observations	3301	3301	3301	3301
<i>Standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001</i>				
<i>Opp: opportunity driven entrepreneur; Nec: necessity driven entrepreneur</i>				
<i>Germany#Transnational: Interaction between country dummy and transnational entrepreneur</i>				

Chile

Chile provides an interesting case study in Latin America, due to its increasing trend of migration over the last decade (the national census of 2012 accounted that 1.2% of the population in Chile were immigrants, in 2015 the percentage of immigrants raised to 2.7%) and the presence of the most dynamic and entrepreneurial ecosystems in this global region (Global Entrepreneurship Index, WEF 2018). The transition to a free market system and open economy exposed Chilean businesses to a significant amount of turbulence and adjustments to international challenges. Increased international trade taught business owners important lessons to compete in global markets, increasing the quality and global competitiveness of the labour force (Lepeley, Pizarro, and Mandakovic 2015). Actually, Chile has free trade agreements with more than 30 countries and double taxation avoidance agreements, which is attractive to foreign investors and entrepreneurs to establish in Chile.

One of the main factors that influences the construction and consolidation of the Chilean entrepreneurial ecosystem is the government policies and programs that have been created in order to promote entrepreneurial activity through incentives for business start-ups (Mandakovic, Cohen, and Amorós 2015). The GEM 2017 expert ratings of the national entrepreneurial framework shows that Chile is in the 15th position over 63 countries in government entrepreneurship programs dimension and held the first place among the Latin American economies. During the last decade the Chilean government has taken important regulatory initiatives pointing to reduce bureaucracy associated to firm's dynamics, for example in 2013 an online platform was created which enables entrepreneurs to start a business in one day for free. Another initiative which took place in 2014 was the creation of a new bankruptcy law renamed "re-entrepreneurship law" that reduces the firms' closure proceedings and enables a new start for entrepreneurs that faced failure. As seen in the results, Chilean transnational show lower levels of fear of failure than non-transnationals and German transnationals.

Both examples are improvements mainly in formal institutional settings in which entrepreneurial activity takes place, but Chile has also presented advances concerning informal institutions, that arise directly from the influence of government programs, that aimed to generate a cultural change towards entrepreneurship (Welter and Smallbone 2011). This is how the Chilean government launched Startup Chile⁵ in 2010, a program that aspired to transform Chile into the innovation and entrepreneurship hub of Latin America, through incentives given

⁵ <http://www.startupchile.org/>

to foreign entrepreneurial teams to locate their businesses in Chile and develop global connections (Melo 2012). The program offers start-ups access to investors, local experts and capital to develop their projects. It exists for more than 8 years (16 generations), and is administered by the Chilean economic development agency (CORFO). The program keeps its international focus, and offers a one-year working visa to entrepreneurs with high human capital in the technology services sector to start or develop their business in Chile, within a maximum period of 15 working days. The entrepreneurs come mainly from the US, Argentina, India and Canada. While quite the significant amount of Chilean TE are from Chile and lived abroad, the most frequent countries of origin of immigrant transnational entrepreneurs are from Argentina, Perú and Brazil, mostly boarder countries.

Table 4.3 shows the results of the Chilean estimations, transnationals have a positive and significant probability of becoming an opportunity driven entrepreneur ($\beta=0.39$; $p<0.01$) and a negative probability of becoming a necessity driven entrepreneur ($\beta=-0.53$; $p<0.01$). In the case of necessity-based entrepreneurs, the negative effect of TE is driven by the self-efficacy level of the entrepreneur. This can be seen by the interaction effect presented in column 8, being a TE only has a negative effect in the probability of being a necessity driven entrepreneur if the entrepreneur declares to have a high self-efficacy. Another interesting interaction can be seen in columns 10, where fear of failure has no effect on the likelihood of becoming a necessity based entrepreneur, however if the entrepreneur is TE, the effect of fear of failure becomes positive and significant for that subgroup.

Table 4.3: Chile Models Estimations

	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec
Transnational	0.39** (0.14)	-0.53** (0.20)	0.11 (0.22)	-0.54 (0.30)	0.32 (0.20)	-0.50 (0.29)	-0.42 (0.58)	0.61 (0.59)	0.48** (0.15)	-0.82*** (0.25)		
Tertiary Education	0.41*** (0.06)	-0.41*** (0.07)	0.41*** (0.06)	-0.41*** (0.07)	0.41*** (0.06)	-0.41*** (0.07)	0.41*** (0.06)	-0.42*** (0.07)	0.41*** (0.06)	-0.42*** (0.07)		
Female	-0.17** (0.06)	0.26*** (0.06)	-0.17** (0.06)	0.26*** (0.06)	-0.17** (0.06)	0.26*** (0.06)	-0.17** (0.06)	0.26*** (0.06)	-0.18** (0.06)	0.27*** (0.06)		
Age	0.01 (0.02)	0.03 (0.02)	0.01 (0.02)	0.03 (0.02)	0.01 (0.02)	0.03 (0.02)	0.01 (0.02)	0.03 (0.02)	0.01 (0.02)	0.03 (0.02)		
Age Squared	-0.00* (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)		
Knows an Entrepreneur	0.12* (0.06)	-0.22*** (0.07)	0.10 (0.06)	-0.23*** (0.07)	0.12* (0.06)	-0.22*** (0.07)	0.12* (0.06)	-0.23*** (0.07)	0.13* (0.06)	-0.23*** (0.07)		
Opportunity Recognition	0.32*** (0.06)	-0.16* (0.06)	0.32*** (0.06)	-0.16* (0.06)	0.31*** (0.06)	-0.16* (0.07)	0.32*** (0.06)	-0.16* (0.06)	0.32*** (0.06)	-0.16* (0.06)		
Self-Efficacy	-0.14 (0.08)	0.03 (0.09)	-0.14 (0.08)	0.03 (0.09)	-0.14 (0.08)	0.03 (0.09)	-0.16 (0.08)	0.06 (0.09)	-0.15 (0.08)	0.04 (0.09)		
Fear of Failure	-0.10 (0.07)	-0.06 (0.08)	-0.11 (0.07)	-0.06 (0.08)	-0.10 (0.07)	-0.06 (0.08)	-0.10 (0.07)	-0.06 (0.08)	-0.08 (0.07)	-0.09 (0.08)		
Knows an Entrepreneur#Transnational			0.44 (0.28)	0.02 (0.39)								
Opportunity Recognition#Transnational					0.12 (0.27)	-0.06 (0.39)						
Self-Efficacy#Transnational							0.85 (0.59)	-1.26* (0.62)				
Fear of Failure#Transnational									-0.61 (0.37)	1.28** (0.46)		
Constant	0.67* (0.33)	-1.41*** (0.37)	0.65* (0.33)	-1.41*** (0.37)	0.67* (0.33)	-1.41*** (0.37)	0.67* (0.33)	-1.42*** (0.37)	0.67* (0.33)	-1.42*** (0.37)		
Pseudo R-squared	0.116	0.050	0.117	0.050	0.117	0.050	0.117	0.052	0.117	0.054		
Observations	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344		

Standard errors in parentheses, * p<0.05, ** p<0.01, *** p<0.001
Opp: opportunity driven entrepreneur; Nec: necessity driven entrepreneur

Germany

With the recent in-migration, especially from the countries of the Middle East and North Africa (MENA), Germany faces a challenge both politically and economically. Politically, because populist parties hugely gained votes in the recent elections, capitalizing on prejudice and fanned fear. Economically because Germany needs to invest in opportunities for immigrants to integrate them into the labour market, either in employment or as entrepreneurs. However, this is a unique opportunity for the country and in light of the fact that many of the migrants might return once their countries of origin are safe again, this would establish new bridges for economic development and knowledge flows if some of them keep their ties to Germany and become transnational entrepreneurs. An advantage to migration into Germany or keeping a German based part of your operations of a business, lies in the access to the domestic market of the EU.

Traditionally the German economy relies heavily on exports with car manufacturing being one of the most important industries together with manufacturing and chemicals amongst others. Although big global players such as Volkswagen, Daimler or Bayer dominate the outside picture of the German economy, the bulk of its businesses is rather small or medium sized and often (inherited) family businesses. Wealth or income distribution is increasingly uneven and taxation and social security contributions are weighing quite heavy on the lower and middle-income households. Whilst generally highly educated, Germany has quite a low count of tertiary educated inhabitants compared to other EU countries. However, the renowned secondary education, the German “Ausbildung” (apprenticeship) covers the largest part of the German workforce and compensates for the comparatively low (but growing) share of tertiary educated people. All that being said, the current economic prosperity cycle is leading to historically low unemployment and high wages which takes its toll when it comes to entrepreneurial activity. A sufficiently paid and secure employment option is quite easy to come by which drastically increases the opportunity costs of becoming self-employed. On the other hand, this increases the current share of opportunity driven entrepreneurs compared to necessity driven ones, which is desirable.

Since GEM collects data on total early-stage entrepreneurial activity (TEA), Germany quite reliable was under the lowest scoring countries, even if only compared to other innovation driven countries. 2016 Germany was on the second last place with a percentage of 4.6 people engaging early stage entrepreneurial activities. Interestingly, migrants show a higher propensity

to engage in TEA than the indigenous population (although they show a slightly increased fraction of necessity entrepreneurship) and although migrants and Germans with a migratory background contribute massively towards the success of the German economy, in-migration is not necessarily perceived positively by the “standard” citizen (German GEM’s National Expert Survey, NES data 2016 and 2017). According to the NES, Germany is quite sufficiently equipped with government programs aimed at fostering entrepreneurship, with financing possibilities and market openness. Shortcomings are found when it comes to politics prioritizing entrepreneurship, entrepreneurial culture and most significantly entrepreneurship education in schools.

While quite the significant number of German transnationals are German born re-migrants, the most frequent countries of origin of immigrant transnational entrepreneurs are Morocco, Poland, Ethiopia, Turkey, USA, Austria, Switzerland and Russia.

About 47,6% of German Entrepreneurship pursued with the motive of following an opportunity whilst just 26,4% is done out of better alternatives for employment. Roughly 27% of the German Entrepreneurs qualify either as migrant or re-migrant transnational entrepreneur which is quite high. Amongst the early stage entrepreneurs, males are more frequent and more than a third have a tertiary education background. Low fear of failure, high self-efficacy, above average opportunity recognition and knowing other entrepreneurs are also characteristics of German early stage entrepreneurs.

Table 4.4: Germany Models Estimations

	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec	Opp	Nec
Transnational	-0.07 (0.18)	0.43* (0.22)	-0.90 (0.50)	0.98** (0.38)	0.14 (0.41)	0.15 (0.54)	-0.69 (0.58)	1.61** (0.57)	0.25 (0.20)	0.24 (0.28)		
Tertiary Education	0.21* (0.10)	0.09 (0.15)	0.21* (0.10)	0.09 (0.15)	0.20* (0.10)	0.10 (0.15)	0.20 (0.10)	0.11 (0.15)	0.18 (0.10)	0.11 (0.15)		
Female	0.10 (0.10)	-0.03 (0.15)	0.09 (0.10)	-0.01 (0.15)	0.09 (0.10)	-0.03 (0.15)	0.09 (0.10)	-0.01 (0.15)	0.08 (0.10)	-0.01 (0.15)		
Age	-0.09** (0.03)	-0.02 (0.04)	-0.09** (0.03)	-0.02 (0.04)	-0.09** (0.03)	-0.02 (0.04)	-0.09** (0.03)	-0.03 (0.04)	-0.09** (0.03)	-0.02 (0.04)		
Age Squared	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)		
Knows an Entrepreneur	0.56*** (0.10)	0.26 (0.15)	0.51*** (0.11)	0.35* (0.16)	0.56*** (0.10)	0.26 (0.15)	0.56*** (0.10)	0.23 (0.15)	0.56*** (0.10)	0.26 (0.15)		
Opportunity Recognition	0.14 (0.10)	-0.20 (0.15)	0.14 (0.10)	-0.20 (0.15)	0.15 (0.11)	-0.23 (0.15)	0.15 (0.10)	-0.23 (0.15)	0.16 (0.10)	-0.21 (0.15)		
Self-Efficacy	-0.28* (0.14)	-0.59*** (0.17)	-0.27 (0.14)	-0.62*** (0.17)	-0.29* (0.14)	-0.58*** (0.17)	-0.33* (0.14)	-0.45* (0.18)	-0.33* (0.14)	-0.56** (0.17)		
Fear of Failure	-0.12 (0.13)	0.32* (0.16)	-0.12 (0.13)	0.32 (0.17)	-0.12 (0.13)	0.32 (0.16)	-0.10 (0.13)	0.26 (0.17)	0.03 (0.13)	0.23 (0.18)		
Knows an Entrepreneur#Transnational			1.01 (0.54)	-0.78 (0.46)								
Opportunity Recognition#Transnational					-0.26 (0.46)	0.34 (0.59)						
Self-Efficacy#Transnational							0.69 (0.61)	-1.41* (0.62)				
Fear of Failure#Transnational									-1.83** (0.57)	0.62 (0.48)		
Constant	1.89** (0.61)	-0.39 (0.81)	1.92** (0.61)	-0.44 (0.81)	1.87** (0.61)	-0.36 (0.81)	1.86** (0.61)	-0.27 (0.81)	1.95** (0.62)	-0.40 (0.81)		
Pseudo R-squared	0.115	0.081	0.119	0.088	0.116	0.082	0.117	0.094	0.128	0.085		
Observations	957	957	957	957	957	957	957	957	957	957		

Standard errors in parentheses, * p<0.05, ** p<0.01, *** p<0.001

Opp: opportunity driven entrepreneur Nec: necessity driven entrepreneur

In Germany, transnational entrepreneurs have a positive and significant effect in the likelihood of becoming a necessity driven entrepreneur ($\beta=0.43$; $p<0.05$), and seemingly no effect in opportunity driven. In terms of interactions, the positive effect of TE over necessity driven entrepreneurship is attenuated if the entrepreneur has high levels of self-efficacy. The effect of TE in opportunity driven entrepreneurship appears to be negative and significant if the entrepreneur has fear of failure, and the effect turns out to be negative. The research statement proposing a negative impact of TE on necessity driven entrepreneurship (2) falls short in the case of Germany but is very accurate for Chile. However, as suggested, there seems to be a major difference in TE between both countries. This comparison will be picked up in section 4.5.

4.4.3 Traits of transnational Entrepreneurs: Country Comparison

A comparative analysis entrepreneur's traits influence on being transnational in both countries is shown in Table 4.5. The results suggest a strong positive and significant relationship between tertiary education and the TE condition using the pooled and each country data. Additionally, opportunity recognition and self-efficacy are also positively related to TE using the pooled data. In Chile, TE is associated with age, self-efficacy and fear of failure. In the case of Germany, TE is associated only with opportunity recognition. This evidence supports research statement (3) regarding country specific differences. However, although the kind of traits associated with transnational entrepreneurs (opportunity recognition, networked: approximated by knowing other entrepreneurs) is found in Germany where TE is strongly related to necessity entrepreneurship. A sign that German institutions clearly do not enable the potential of TE.

Table 4.5: TE Traits Results

	Transnational		
	Pooled Data	Chile	Germany
Tertiary Education	0.40*** (0.08)	0.46*** (0.10)	0.33* (0.14)
Female	-0.14 (0.08)	-0.14 (0.10)	-0.10 (0.15)
Age	0.03 (0.02)	0.07* (0.03)	-0.04 (0.04)
Age Squared	-0.00 (0.00)	-0.00* (0.00)	0.00 (0.00)
Knows an Entrepreneur	0.09 (0.08)	-0.03 (0.10)	0.30* (0.15)
Opportunity Recognition	0.24** (0.08)	0.17 (0.10)	0.48** (0.16)
Self-Efficacy	0.35* (0.14)	0.49* (0.20)	0.17 (0.22)
Fear of Failure	-0.11 (0.10)	-0.33* (0.13)	0.26 (0.17)
Germany	0.25** (0.08)		
Constant	-3.00*** (0.50)	-3.82*** (0.65)	-1.38 (0.87)
Pseudo R-squared	0.054	0.063	0.064
Observations	3301	2344	957
Standard errors in parentheses, * p<0.05, ** p<0.01, *** p<0.001			

4.5 Discussion: Parallels and Differences

Having much higher levels of entrepreneurial activity than Germany, Chile also performs well on the quality side of those activities. With high levels (relative) of opportunity driven entrepreneurship both countries show similar patterns. Surprisingly Chilean entrepreneurs seem to know, on average, less other entrepreneurs than German ones do, given the fact that Chile has more entrepreneurs per capita, with many of them in a single concentrated geographical area (Santiago). The German sample is a bit more skewed towards male entrepreneurs than Chile but the differences are rather small. Also, the German entrepreneurs are, on average, about four years older. The characteristics of German and Chilean entrepreneurs are quite similar and comparable. The only significant difference is the share of transnational entrepreneurs compared to all entrepreneurs. With 27,2% transnational entrepreneurs, Germany has a higher percentage of transnationals than Chile (21,7%). Given the fact that Chile has a lot more entrepreneurs in total however, Germany still has less transnational entrepreneurs per capita.

The models show very different pictures. While the statement that being a transnational entrepreneur increases the likelihood of being an entrepreneur driven by opportunity receives a positive result for Chile, the opposite is the case for Germany. Having a high level of education also pushes the probability of being opportunity driven in Chile while it does not seem to have an effect in Germany. This, however, might be due to the fact that Germany has quite a high level of education on the secondary education level. More than 40% of German TEA is accountable to people having “just” a secondary education degree. Comparing levels of education between different countries always poses some difficulties regarding the comparability. When it comes to gender influence, Chile shows significant impact of the female control variable. Women more often seem to have to rely on becoming self-employed because of necessity and are less often entrepreneurs to exploit an opportunity than men in Chile. This implies gender specific imbalances within the entrepreneurial and work culture such as a more restrictive access to capital or job availability. In Germany gender has no effect on whether an entrepreneur is opportunity or necessity driven. Although women less often found businesses, they seem to do it out of the same motives as men do.

In both countries public institutions are a major player in the support structure for entrepreneurship and new firm foundations. The difference however is that the Chilean government is heavily subsidizing new firms with financial capital whilst the German programs mainly supply non-monetary support although migrant entrepreneurship (but not TE support in

particular) nowadays belongs to the most important elements of government policies to support “inclusive entrepreneurship” in Germany (see Sternberg 2017).

Mining and exporting ore, especially copper, was one of the core income generators for Chile and still is very important. Trying to refocus towards a more diverse economic structure the Chilean government focuses intensely on promoting entrepreneurship and supports start-ups through accelerators, co-working spaces and specific programs. This is definitely not the case in Germany. For many parties, entrepreneurship is not part of their main agenda and entrepreneurship support that does exist focuses on guidance, counselling and networking rather than subsidizing with no strings attached. However, in terms of market openness Germany seems to offer a better context for growing businesses. Historically grown, Chile suffers from quasi-oligopolistic structures in some industries. (retail, finance, food, etc.). Although it seems to be quite easy and extremely fast (1 day) to start up and grow initially, there is a certain point where the market is dominated by very few players, ceiling the growth ambitions of smaller enterprises. The influence of traits on being transnational or not differs for both countries as well. Surprisingly the combination of traits contrasts to the country specific influence that TE has on being opportunity driven. While the kind of TE that is hypothetically good for fostering EES is found in Germany, those entrepreneurs seem to have to become necessity driven entrepreneurs, without being fully enabled to contribute to the countries EES.

In total Chile seems to be more successful when it comes to attract opportunity driven transnational entrepreneurs. This might indicate better policy or more suitable incentives for attracting the right kind of transnational migrant entrepreneurs. Chile spends a lot more “direct” money on entrepreneurship than Germany in terms of financing the start-ups. However, programs like Start-Up Chile do not only supply money, co-working and networking, they demand some feedback into the entrepreneurial ecosystem from the entrepreneurs they as well. For example, by giving lectures about their start-ups or entrepreneurship related topics at universities increasing awareness for entrepreneurship and supplying role models and mentors for younger generations. The first step was to generate legitimacy around entrepreneurial activity, and in that sense, Start Up Chile was a successful program. Other challenges have to do with the scalability and incorporation of locals in this acceleration programs, that’s why the CORFO the last couple of years expanded the scope of the programs offered, even Start Up Chile has at least three lines of development associated with inclusion of women, TECH visas and scalability of the start-ups.

At a first glance the opposing effects of TE in Germany and Chile are surprising results. However, if the institutional contexts and entrepreneurial climate are factored into the consideration, it is not unlikely that both countries attract and harbour different manifestations of TE. Both countries' most frequent country of origin for immigrant transnational entrepreneurs are less developed than the host country (Germany: Morocco, Chile: Peru and more recently Haiti). The latter fact would speak in favour of attracting the same type of TE. Since this is not the case, differences in the elements of the national system of entrepreneurship like entrepreneurial culture (i.e. spirit or climate), in institutional context and in policy could also explain not only different levels of entrepreneurial activity but also the share and type of transnationals. With Chile heavily focusing policies to attract foreign business founders, Germany awakens very slowly and is not doing much in this regard. Not only was migrant economics only recently "discovered" as an important field to support but also the TE demographic was rather neglected in Germany up until recently.

Only seen in case studies so far, it is now empirically proven that there are different types of TE regarding their motivation for entrepreneurship. As presumed in theory, TE seems indeed to be subject to heterogeneity. Hypothetically at least one factor influencing the behaviour of transnationals could be whether the motive for migration was being pulled into Chile or Germany or rather pushed out of the country of origin. However, when looking at the different kinds of TE and their potential to contribute to EES, the answer does not seem to be so easy as suggested in the 4th research statement and opens up a compelling new field of research.

4.6 Conclusions

With TE being increasingly relevant as well as harbouring an untapped potential for economic development and thriving EES there was still almost no quantitative empirical analysis available to explore this phenomenon. By employing data recently collected by the Global Entrepreneurship Monitor we were able to show distinct influence of TE on opportunity and necessity driven entrepreneurship. Furthermore, there is a strong hint in the data that transnationals display traits such as higher opportunity recognition and know, on average, more entrepreneurs, are less afraid of failure and have a higher degree of self-efficacy than non-transnationals. We were able to show considerable differences in TE behaviour between Chile and Germany and argue that those can be related to differing institutional contexts and levels of economic development. This implies differences in TE impact on EES depending on the

country specific framework conditions. While Chile displays TE with such traits higher opportunity recognition, Germany does not. There cannot be drawn a conclusive finding on the relationship between EES and TE but our article opened up some interesting path for further research in this direction.

An exploratory empirical article like this contains a few shortcomings: Due to the low level of TEA in Germany and thus low level of TE within the German sample, instead of the more precise measure for entrepreneurial activity (TEA) owner-managers of established businesses had to be included to receive robust results. Additionally, the Chilean data is just from one year whereas the German data needed to be compiled from 2016 and 2017. Furthermore, the data did not allow for a more in depth analysis of the interdependent relationship between EES and TE. Also due to sample size restrictions and TE being a rare event within a rare event (at least in Germany TEA can be considered to be rare) a rather wide interpretation of the TE definition had to be applied. With more data available in the future, the results have to be replicated and refined.

It is meanwhile widely acknowledged that the institutional environment of an individual may significantly influence its propensity to start a firm (Veciana, 2007). This is true for transnational entrepreneurs as well. Government policies to support entrepreneurship are an important aspect of the institutional environment (see Terjesen, Bosma, and Stam 2016). However, while having recently grown significantly in numbers, such government policy initiatives and programs do rarely explicitly address TE (see Murdock, 2012, Pickernell et al. 2013). Therefore, we provide some country-specific implications for governments' entrepreneurship support policies in favour of TE.

In the case of Chile, transnationals are mainly opportunity driven entrepreneurs, highly skilled and with a high self-assessment of their entrepreneurial skill set. This addresses the needs of a developing economy that searches to exploit its opportunities in order to increase the levels of productivity. Policies and programs that focus on expanding opportunities and promoting TE, must be implemented in a deeper way. Start Up Chile was an exemplar case, but restrictions in terms of visas for foreign entrepreneurs and more active participation of the private sector, especially in terms of entrepreneurial finance are needed.

For Germany empirical results clearly prevail that transnational entrepreneurs are, in relative terms, more frequent than in Chile, and that their likelihood of becoming a necessity driven entrepreneur is obvious. While German government's entrepreneurship support policies have

developed a noticeable number of programs to support migrant entrepreneurship in recent years (Sternberg 2017), none of these programs explicitly address opportunity entrepreneurship or even growth-oriented, ambitious entrepreneurship. However, this does not mean that policymakers believe that supporting these groups will automatically increase start-up rates. It is rather to overcome handicaps in terms of involvement ("Teilhabe"). Future government policies to support migrant entrepreneurship should more explicitly address the growth potentials of transnational entrepreneurs, and this might be necessary as both the number of self-employed as well as the start-up rate rather continuously decreased in recent years. While the total number of self-employed decreased by 5% between 2007 and 2016, those born in Germany even decreased by 8.1%. Thus, immigrants helped to attenuate the decrease of self-employment. Future government policies are suggested to address male immigrants from other innovation-driven economies in particular as in Germany those are more entrepreneurial than non-migrants and female migrants (see Brixy, Sternberg and Vorderwülbecke 2013; Xavier et al. 2013). Government support policies may, thus, consider the countries of origin of the migrants more explicitly than in the past. This seems also be significant as migrants in general and from some countries in particular benefit much more from the treatment effect (the income effect solely due to the decision for self-employment) than Germans. In Germany, Turkish migrants benefit the most from their self-employment decision, while southern Europeans exhibit the lowest income relevant skills (Hopp and Martin 2017). Furthermore, migrant entrepreneurs in general and transnational entrepreneurs in particular should also be considered to be an option when it comes to one of the biggest problems of the German "Mittelstand" in the long run: Although there is an increasing number of companies still led by entrepreneurs who will soon retire but do not find someone who is willing to take over the company, the proportion of interethnic take-overs is very low.

Continued data gathering on TE will allow a deeper understanding of how TE influences and is being influenced by entrepreneurial motives but also contexts such as the EES. The institutional (national) contexts as well as level of economic development seems to play a decisive role in which form of TE emerges in a given context. Additionally, the linkages between TE and EES need to be explored further when a profound empirical analysis is possible through newly developed data sets. Especially interdependencies of both phenomena as well as on a meta as on the individual level need to be explored to develop special tailored policy recommendations to fully utilize the potential of TE.

5 Measuring entrepreneurial ecosystems at regional level

This chapter is based on:

Sternberg, R., von Bloh, J., Coduras, A. 2019. A new framework to measure entrepreneurial ecosystems at the regional level. *Zeitschrift für Wirtschaftsgeographie (= The German Journal of Economic Geography)* 63(2-4): 103-117.

As of January 2021 the ecosystem Index ESI of the GEM has been applied in more than ten regions worldwide and has developed further from the stage of the index displayed in this paper. The most recent iteration can be reviewed in Coduras and Hill (2020).

Abstract

The term ‘entrepreneurial eco-system’ (EES) currently belongs to the most popular ones in economic geography – and in the practice of start-up support policies in many countries, too. Due to its exclusively positive connotations the usage of this term creates unrealistic hopes among entrepreneurship support practitioners. Scholars may be reminded to previous supposed panaceas of regional economic policies like clusters, ‘creative class’ members or high-tech industries. As for these predecessors as well, the concept is “*fuzzy*” (Markusen 1999), the available empirics are “*scanty*” (ibid.) and its perception among policymakers is oversimplified, exclusively positive and partially naïve. To a degree, this is a consequence of an extremely unclear definition of what is meant by an EES.

The undertheorization of the EES discourse, as observed by some scholars, is not due to a lack of conceptual approaches per se, but due to a lack of convincing, theoretically strong approaches. In fact, the majority of the EES publications is conceptual or even theoretical, usually without any serious empirical underpinning. From our perspective the latter has one important consequence: EES theory is weak because there is a lack of representative, comprehensive and sophisticated empirical studies, indicators and methods to measure EES. This paper provides a unique attempt to measure EES at the sub-national level of regions, that is, from our perspective, the most appropriate spatial level to identify and measure (and theorize) EES as the regional entrepreneurship literature provides striking evidence in favor of entrepreneurship as being primarily a regional (or local) event.

Our paper contributes to the current EES debate by arguing that a robust empirical measurement of various EES at the sub-national level may help to improve the quality of EES theory. We propose to start with Erik Stam’s interpretation of an EES based upon ten “conditions” for whom we develop specific variables for application in concrete data collection exercises in different regions. We develop an overall EES index as well as subnational indices for each of the ten conditions. We also propose a method to care for the various weighting problems to be solved. Our attempt has been successfully pretested in Germany and Spain and has meanwhile entered a more ambitious pilot phase in 2018. One of this paper’s aims is to get feedback from scholars studying EES regarding our proposed method.

Keywords:

entrepreneurial eco-system; entrepreneurship theory; region; regional growth

5.1 Introduction: Entrepreneurial Eco-Systems and the Relevance of empirical Evidence

The concept of Entrepreneurial Eco-Systems (EES) is currently the basis of a quickly increasing number of policy initiatives in various countries, sub-national regions and cities attempting to improve their entrepreneurial performance through entrepreneurship support instruments. It is symptomatic to observe that a young and empirically virtually unproven concept is gaining almost worldwide acceptance among practitioners. To a certain extent, history is repeating itself: in a similar fashion to previous supposed panacea of regional economic policy strategies, such as the cluster approach in the 1990s (Porter 1998) or the creative industries concept since the early 2000s (Florida 2002), another new concept mainly driven by US economists has very quickly been adapted by practitioners, although the current state of research is not as advanced to produce reliable and applied policy implications. EES are proclaimed to be a silver bullet for unlocking the endogenous economic growth potential of nations, regions and cities, albeit lacking a solid empirical foundation (see Stam 2018 and Nicotra et al. 2018 for two rare exceptions).

This is surprising, as the current state of EES research reveals a significant lack of empirical evidence regarding several basic assumptions of the EES idea (Malecki 2018). Although the systemic element is crucial for the theoretical argumentation, no empirical studies so far have seriously tackled the complicated question of how to measure this system empirically in a proper sense (see Stam 2015). Leaving aside the often-ignored problem of precisely defining an EES in a way that allows for quantitative measurement, several assumed causal relationships have not yet been systematically tested in one specific territory. Although most of the quickly growing academic literature on EES is more or less conceptual, the causality in question is still to be decided, meaning that tautology seems to be an attribute of some of the relationships between elements of an EES (see Stam 2015). The question of the appropriate spatial level for an EES also remains unanswered - another parallel to the cluster hype of the 1990s. Furthermore, there is currently no consensus about the methods to be used to quantitatively describe and explain an EES. Without a clear and accepted methodology, an empirical description and explanation of EES (and a comparison between several of them) is not feasible. The previously mentioned weaknesses, however, complicate empirical testing of the EES concept, making it a difficult task to be developed predominantly in a deductive way. Deductive concepts, however, must be empirically validated.

In this paper, we consider an EES to be the most prominent current example of entrepreneurship systems (for alternatives see Acs, Autio and Szerb 2014) and define it, in accordance with Stam and Spigel (2018, 2017), as a system in which the components are actors (i.e. individuals), organisations and factors. These components coordinate “*in such a way that they enable productive entrepreneurship within a particular [region]*”. The term “region” is used as a synonym for sub-national units. Productive entrepreneurship is interpreted as start-ups which are characterised by either one or more of the following aspects: innovative product or service, intention of scaling or growing, potential high impact on (regional) economic growth and growing number of employees. We accept that there are many other definitions of an EES - and several authors, while using the term, do not define it at all. Without a clear definition, such a concept is just a metaphor for very different ideas - and would soon lose its current credibility. While using the above definition, we explicitly do not intend to measure the effect of an EES at this point. Instead, we suggest a framework for empirically describing the EES itself and for assessing the degree to which a given sub-national territory meets the conditions that make up an EES. The main methodological purpose of this paper is thus to present a tool for measuring the core conditions associated with an EES, but not to decide whether or not a territory is/has an EES at all. Our perception of the concept is that each sub-national territory has at least some ingredients of an EES, meaning that the extent to which an EES does exist is measurable (and comparable across regions). In Malecki's words (2018:14): we intend to measure the “*degrees of ecosystems*”.

This paper's contribution to literature is an analytical tool to quantitatively measure the attributes of an EES in specific sub-national territories. We do so by starting with a short overview of the state of empirical EES research (section 5.2), followed by a description of Stam's interpretation of the EES concept, that, according to our view, is currently the most appropriate understanding of an EES when attempting to measure it (section 5.3). In section 5.4 we develop, based on Stam's model, an empirical proposal for measuring the core EES elements (Stam's Eco-system Conditions, hereafter abbreviated as SECs) and some of their connections at the sub-national level of regions. Section 5.5 concludes.

5.2 The concept of Entrepreneurial Eco-Systems: State of research and challenges for (future) research

Despite empirical and conceptual research gaps regarding the interdependent relationship between individual entrepreneurial activities and the (regional) context, regional entrepreneurship research has shown significant progress in the last two decades and has developed into a versatile, publication-rich and interdisciplinary research field (see the overviews by Trettin and Welter 2011; Sternberg 2009; Baumgartner, Pütz and Seidl 2013). There is a large potential for combining this regional entrepreneurship literature with the EES idea. For both streams of research, the regional context of entrepreneurial activities is considered the core factor enabling and supporting them, alongside other factors at the individual, the national or the supra-national level. Consequently, multi-level methods are often an appropriate method for explaining entrepreneurship of sub-national regions (see e.g. Hundt and Sternberg 2016). There is no doubt that the systemic aspect of national as well as regional economies is under-researched (Radošević 2007), which is true for EES as well (see Autio, Pathak and Wennberg 2013 or Levie and Autio 2011 for some exceptions at the national level). The Global Entrepreneurship Development Index (GEDI, see Acs, Autio and Szerb 2014) at the national level and the „Regional Entrepreneurship Development Index“ (REDI, see European Commission 2013 and Qian, Acs and Stough 2013) for sub-national (European) regions also intend to provide an empirical solution for the measurement problem of EES, but they are restricted to quantitative and publicly available data describing some "pillars" without adequately addressing their systemic character.

The first steps towards a systemic view of entrepreneurship were made by Dubini (1989), focusing on context factors and available role models, as well as by van de Ven (1993). Spilling (1996) embedded entrepreneurship into the context of a “mega event” as a part of an entrepreneurial system and took the region as unit of scale. An early case study examined the creation of new high-growth high-tech ventures (Neck et al. 2004) through systemic conditions. Malecki (2009) looked at factor and context differences between places making them more or less entrepreneurial, emphasising the role of economic geography in entrepreneurship research. Malecki (2018) recently provided a thorough and almost complete overview of the current state of literature on EES.

The EES concept quickly gained popularity with practitioners when Isenberg (2010) and Feld (2012) created a set of instructions and factor conditions to allegedly build successful EES

despite a broader empirical base. However, the literature on EES policy has now arrived at more scientific depth. Most of it is targeted towards innovative, high-growth start-ups (e.g. see Mason and Brown 2014; Napier and Hansen 2011; Spigel 2015). Morris, Neumeier and Kuratko (2015), however, suggest that this narrow policy focus could lead to a decline in less innovative or growing SME entrepreneurial activity within a region through lack of support and through demotivation of “standard” new firms. According to Shane (2009), this would be a desired outcome.

In the literature on EES many different adaptations of the EES concept exist. Alvedalen and Boschma (2017) state five major shortcomings of the current approaches to EES: the lack of a clear analytical framework for assessing EES internal causalities and unravelling interdependencies, the unsolved systemic and network relations between EES elements (see also Mack and Mayer 2016), the badly understood role of institutions, the dominance of case studies without comparability, and the need for a dynamic perspective on EES. The last two items in particular need to be emphasised.

More indirectly linked to the EES concept but of high relevance is the work of Feldman and Zoller (2012) and of Kemeny et al. (2016) who propose to cover regional levels of social capital and vibrancy of new firm formations through the presence of dealmakers who they identified from data on Capital IQ. Kemeny et al. (2016:1101) showed that new firms linked to dealmakers would be “*rewarded with substantial gains and employment sales*”.

Dealmakers are individual actors highly embedded in regional networks or “*the social structure of a place and actively undertake building local capacity*” by assuming “*roles that make connections from which knowledge spills over to lower the costs of engaging in innovative activity, thus creating regional vibrancy*” (Feldman and Zoller 2012:24). Their results, which are mainly based on literature reviews and correlation analysis, show high levels of connections between dealmakers’ presence and new firm formation. However, while certainly an interesting and innovative way to measure social capital and, in terms of EES, leadership, their approach contains some restraints when to cover the wide array of regional EES and their factor combinations worldwide. For example, their data shows, that dealmakers are not an indicator for regional availability of financial capital since the correlation between dealmaker and investors is close to zero. Furthermore, covering different stages of EES would be problematic as well. Even if dealmakers serve as a proxy for EES, stages in which all other EES elements would be an indicator of creating or attracting future dealmakers would not show as becoming

an EES but simply as not being one. Missing embeddedness of established firms into the start-up scene is also a constraining factor. While desirable, not every (emerging) EES shows many linkages between existing established firms and start-ups. Dealmakers seem to be an excellent measure for one particular element of an EES, leadership, but do not cover the majority of the remaining elements or dimensions.

Much of the theoretical work as well as many case studies and policy programmes lack a proper definition of EES. To the authors' knowledge, there is no unified and agreed-upon definition available (see Malecki 2018 or Autio and Levie 2017 for summaries on EES definitions). This in line with general entrepreneurship research and due to the wide array of disciplines engaged in EES. However, in order to create a valid and reliable methodology to produce comparable data, a definition is inevitable at least for our approach. This paper utilises an adaptation of the definition and concept developed by Stam (2015). It has proven a good fit with the conceptual framework of GEM. While it consists of pillars representing relevant factors and institutions, it does include some careful hints at systemic relations as well. The clear structure of Stam's design was a good starting point for creating statements which can be used to develop our index (see section 3). We do not argue that it is the best or even the only viable EES definition but it is the one we have chosen to test our methodology.

Mason and Brown (2014), who are important contributors to the development of the EES literature, emphasise formal and informal interconnectedness of entrepreneurial actors, organisations, institutions and processes. They state that at the core of an EES lies at least one "large established" business which drives the local EES. However, one may argue that country-specific or even region-specific heterogeneity could lead to many different compositions of EES (see Spigel, 2015) and of hierarchy among actors, not just the one stated by Mason and Brown (2014). If there is a certain aspect of heterogeneity between EES, this should be reflected in the methodology. Conceptual work on EES mostly draws on an Anglo-American comprehension of entrepreneurial culture and the role of state and institutions. However, a methodology capturing EES conditions and existence producing globally comparable data demands an approach with less influence of the geographical heritage of the EES concept. It should be able to capture the place specific system, culture and institutions of the region it is applied to without being predefined by a set of expected outcomes based on one single nation.

The EES concept of Spigel (2015) is based on a relational view of intertwined attributes: social, cultural and material. He applies this approach to different Canadian regions to demonstrate

that configurations of EES can differ quite strongly. A relational perspective is also provided by Sorenson (2017) when applying an ecological lens to regional ecologies of entrepreneurship. His paper sheds some light on the fact that entrepreneurial activity is both input and outcome of a regional entrepreneurial system or environment by taking a dynamic perspective applying evolutionary economic geography.

This paper aims to contribute towards the development of a systematic, applicable and reproducible methodology for capturing the different dimensions and fragments of an EES and its context within defined sub-national territories called regions. The heterogeneous picture painted by the state of EES literature is especially underdeveloped when it comes to transferable methodologies for the configuration of its conditions. With focus on policy implications, measuring EES and its components is imperative (see Vogel 2013).

Some noteworthy attempts have been made to describe and, in some cases, to explain EES, although these studies are not easily comparable, since they vary in spatial levels, methodology and definition. Acs, Autio and Szerb (2014) created a complex national system of entrepreneurship index based on many different data sources such as GEDI, GEM, World Bank and many more. In order to picture systemic processes, they applied a “*penalty for bottleneck*” approach. The weakest factor penalises the total score, since the missing factor quality cannot be compensated for through high scores of other variables. This is an assumption which is not yet proven. Acs, Autio and Szerb (2014) suggest that an index method for measuring national systems of entrepreneurship (NSE) needs a broad range of components and measures to capture system level framework conditions in addition to individual level measures, and it should be able to reflect system dynamics and interactions between system components. However, data for the manifold different components which result in the (complex weighted) index are not easy to obtain on a regional level. As a first point of departure, compromising quality of fit between data and EES conditions to receive an initial preliminary approximation of a (national) EES measurement was justified. Due to data restrictions, this approach is not transferable to sub-national regions.

Another methodology for capturing EES was developed by the Massachusetts Institute of Technology, named the Regional Entrepreneurship Accelerator Program (REAP; see Levie et al. 2014). Drawing from REAP methodology, Levie et al. (2014) used GEDI data, expanded by a stakeholder analysis, to assess the EES of Scotland. Although regions like Scotland are technically sub-national territories, NUTS-1 or NUTS-2 regions may be still too large to

identify an EES (see also Bruns et al. 2017). Although well-made, this approach bears similar problems regarding measuring regional EES to Acs, Autio and Szerb (2014). While the GEDI methodology was an important first step, it lacks the necessary depth to grasp the specifics of EES.

Audretsch and Belitski (2016) applied a model consisting of a mix of individual perception data sources to explain EES in cities. Data was extracted from Eurostat and REDI (Regional Entrepreneurship and Development Index). Although limited to pre-existing data sources with low observation counts authors were able to build a model to assess small-scale regional EES (i.e. city-level). While the chosen spatial scale is close to the desired level, a cohesive region is not necessarily limited to urban areas. Interactions and systemic processes could not be captured with this approach.

Building upon a framework developed by Stangler and Bell-Masterson (2015), Taich et al. (2016) created a mixed method approach to identify EES indicators and EES indicator value to entrepreneurs in 150 Metropolitan State Areas in the USA, supplementing statistical data on EES indicators regarding density, connectivity, fluidity and diversity with interviews. Although partly successful, they encountered problems of cost intensiveness, inaccessibility or unavailability throughout their indicators.

Napier and Hansen (2011) combined both quantitative and qualitative methods in 16 sample regions, most of them in the USA. The qualitative insights were based on interviews with EES key actors, whereas the quantitative approach was designed to explore ways to “quantify and benchmark” regional ecosystems. They built three indicators for assessing EES performance based on regional data, partly supplemented by national or state-level data when regional data was not available, i.e. “*employment in young companies, invested venture capital and patenting applications*” (ibid 2011:6). By using so-called “dealmaker data” from CapitalIQ their goal was to review whether dealmaker data can be a proxy for EES performance, thus being able to avoid piecing together performance indicators from numerous sources. The approach is completely tailored to young high-growth firms and works with proxies for the complete system rather than individual components, making it vulnerable to different EES compositions and individual regional strength that may not be covered by the applied proxies.

Geibel and Manickam (2015) compared the start-up ecosystems of Germany and the USA by letting a low number of start-ups administer scores to a set of factors grouped into three sections.

While this approach involves several risks, it could identify a set of success factors which are more important to start-ups than others.

Stam (2018) proposed measuring EES elements using ten EES conditions or elements as EES pillars. The same concept is used as a basis for the methodology developed in this paper. Stam assigned available proxy variables from different data sources to each element, such as “new firms registered per 1000 inhabitants“, to cover entrepreneurship culture. He then calculated an index by adding up each normalised element value with each element having the same weight. This method was applied to the Netherlands, producing scores of the provinces which could be ranked. To cover the systemic nature of EES, a second index was proposed in which the outcome is not a sum, but rather the product of each normalised element value. However, although this increases the variance between scores, it does not cover different factor compositions of regions. Although this approach makes several steps in the right direction, the complexity of each element category is not sufficiently covered by the assigned proxy variables, since many elements consist of one variable only.

The majority of approaches reviewed differs strongly regarding their applied methods for capturing EES. The major limitation does not refer to single studies but to the inconclusiveness of the collectively supplied data and insights from them. While each of these studies is a unique stepping stone to understand a single EES, their diversity creates serious limitations in terms of EES comparison. Their place based unique structure restricts transferability to other regions.

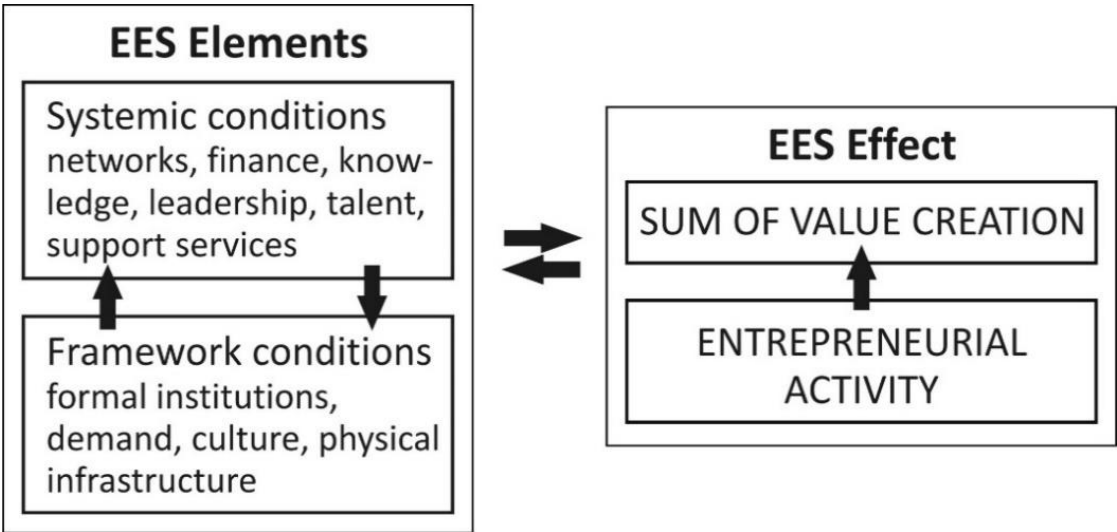
Some studies already tackle the unique challenges of EES assessment through triangulation, applying mixed method approaches (e.g. Levie et al. 2014 or Taich et al. 2016). Although qualitative case studies, which are dominating empirics on EES, are irreplaceable for in-depth understanding of individual EES, overarching commonalities, comparability (and hence politically desired rank ability), categorisation and overall analytic statistics cannot be covered unless region-specific quantitative data is available. Therefore, our approach in favour of quantitative EES data should be seen as necessary and complementary to case studies. The higher the number of regions covered with comparable methodology, the better the data pool for understanding the EES phenomenon. Complemented by qualitative in-depth studies of selected regions, this could be the way forward to close the gap of the empirical EES void. The resulting broad empirical basis would be invaluable for testing and refining (and thereby thinning-out) the current sprawling theoretical body of EES and for producing effective as well as efficient policies aimed at fostering or creating an EES based on the individual conditions of

a region. Additionally, there is a need to refine the nomenclature of EES or at least to generate a set of clearly defined elements and internal processes in order to allow for EES of different forms but based on a solid paradigm. To help establish such a paradigm, it is essential to build it from a solid empirical foundation, which helps to identify the different compositions of EES and their meta-level commonalities in order to complement and link the insights created by qualitative case studies.

5.3 Erik Stam’s Concept and Operationalisation of Entrepreneurial Eco-Systems

As a starting point for developing the methodology, the ecosystem concept of Stam was chosen (see Stam 2015; Stam 2018; Stam and Spigel 2016). The model is focused on the conditions of a region to promote and sustain entrepreneurial ecosystems. Figure 5.1 delivers an overview of the systemic nature in which the conditions are embedded. Stam conceptualised an integrative model containing the interdependencies of functional attributes (or conditions) of EES with entrepreneurial outputs and welfare outcomes.

Figure 5.1: Systemic relations of ecosystem conditions in Stam’s EES model



The model is based on the division of framework conditions and systemic conditions. The framework conditions consist of the social (informal and formal institutions) and physical conditions, enabling or constraining human interaction. Systemic conditions include networks of entrepreneurs, leadership, finance, talent, knowledge and support services. The context conditions used throughout this paper are based on interpretations of these EES conditions (in the following SECs).

NETWORKS - Networks cover the interaction between the players in an ecosystem. Dimensions could include network density, nature of ties (strong or weak), and the amount and quality of connecting events, amongst other factors.

LEADERSHIP - EES have to be led by visible, accessible and invested entrepreneurs (individuals or groups, see Feld 2012), with “invested” meaning more than just interest in short-term monetary gains, for example mentoring, representing or feeding back into the community.

FINANCE - Availability of financial capital for the EES: bank loans, government grants/subsidies, venture capital, business angels and other forms of financing which should be available, visible and accessible across sectors, demography and geography.

TALENT - Local accessibility and availability of relevant human resources covering a highly skilled and/or educated workforce. Broad and deep talent pool of employees in all regional relevant sectors and areas of expertise. Especially for young start-ups, fresh and affordable talent from universities can play a major role in keeping them in the region.

KNOWLEDGE - Production and diffusion of knowledge. Creation or recombination of knowledge through universities, research facilities and research and development efforts of incumbent firms. Transmitting knowledge through or to start-ups by diffusion, spillover or spin-off.

SUPPORT SERVICES/INTERMEDIARIES - Need for a solid presence of effective and well integrated accelerators, incubators, intermediaries, professional services (training, legal, accounting, real estate, insurance, consulting) with reasonable and sufficient quality.

FORMAL INSTITUTIONS - Laws, the legal system, regulations or taxation as well as level of bureaucracy. Role of the government. Formal institutions are mainly provided from the national government which impacts the role of the region.

CULTURE – Facilitation of regional entrepreneurial activity through informal institutions. Values, norms, routines, perception of self-employment, risk-aversion, openness, fear of failure.

PHYSICAL INFRASTRUCTURE – Affordable and accessible real estate, communications, roads, railways, airports. Existence of incubators and science parks.

DEMAND – Visible, dynamic, reactive and accessible internal and external markets to which the business model can be shaped. The spatial dimension of market location or size can vary in importance, form and magnitude depending on the specific product.

The existence and quality of SECs has to be seen as being embedded in a systemic dimension, meaning the mechanisms through which the SECs are interlinked and interdependent. Different successful ecosystems may vary strongly regarding the composition of EES components. This has to be taken into account when weights are used to create an EES index. There might not be the “one” best factor combination, with instead many different sets leading to a comparable outcome.

5.4 Measuring an Entrepreneurial Eco-System: a Proposal

5.4.1. Basics

Within the rapidly growing EES literature, Acs et al. (2017:2) claim to have identified two lineages of the EES approach: the strategic one, viewing EES as “*a form of economic coordination*”, where business performance is based on the interplay of “*actors that produce complementary products*”, and the regional development side rooted in systems of innovation, industrial clusters and districts literature, addressing varying performances of regions. Having a spatial perspective on EES is vital, since many underlying functionalities and assumed systemic relations within EES are sensitive to distance between and density of EES fragments or actors, and are thus less likely on a larger geographic scale (see Feldman 2001). Our attempt to measure an EES is based on Stam's ten "conditions" described in section 5.3. We propose measuring an EES for one (or several) specific spatial entities, based on administrative boundaries, for example a NUTS3 region in the EU or an MSA in the US. This should usually be applied to a sub-national territory, given the fact that entrepreneurship is primarily a regional (=sub-national) event, with most of the context effects caused by regional attributes and most

effects of an entrepreneurial activity being restricted to the regional environment (see Malecki 2018). Spatial proximity has numerous impacts on factors influencing entrepreneurial activities, such as the accumulation and quality of creativity-related human capital (see, for example, Sternberg and Kraus 2014 on the relation between entrepreneurship and creativity), social context, networks (see Huggins and Thompson 2015), and the production and diffusion of knowledge, or knowledge spillovers in general (e.g. Glaeser et al. 1992). Face-to-face contacts or meeting opportunities by chance are relevant for the spillover of tacit knowledge in particular. Local inertia plays an important role when spin-offs from large established businesses or universities choose their location. Advantages for entrepreneurship through agglomeration and urbanisation factors are evident as well (e.g. see Bosma and Sternberg 2014), and regional characteristics have an indirect effect on opportunity recognition - and thus on start-up activity (see Stuetzer et al. 2014). Alongside the positive impacts of regional characteristics, however, there are negative ones as well: Upa's Tree effect (large incumbent firms "suffocating" new businesses), a higher degree of competition, lock-in effects if no outside links are established and, in general, negative external effects. Consulting the economic geography or regional economics stream of literature is recommended in order to understand the role of spatial proximity in entrepreneurial activities. Almost all known major ecosystems are confined to sub-national, often urban regions.

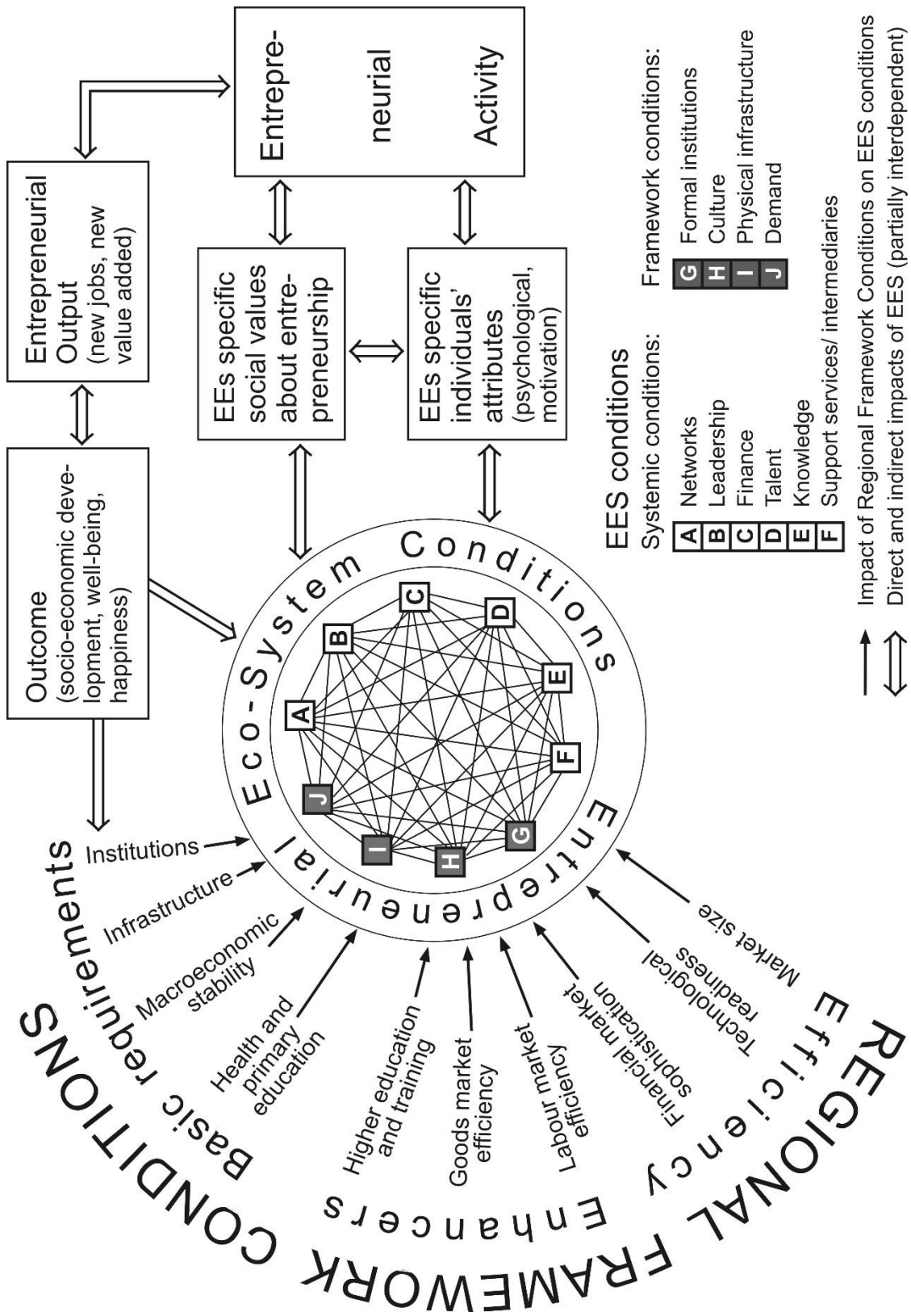
Our attempt is based on quantitative survey data and may later be supplemented by qualitative data and respective data analysis methods. Both cross-sectional as well as longitudinal data is needed. We suggest measuring an EES by the perception of the people living in the respective region. These people include entrepreneurs, the much more numerous non-entrepreneurs (but potential entrepreneurs) as well as professional experts dealing with entrepreneurial activities who are related to (or even employed by) the organisations in a region and who are responsible for specific EES elements described in section 5.3. Consequently, activities and perception of local "entrepreneurship experts" as well as those of the local (entrepreneurial as well as non-entrepreneurial) population have to be covered by data collection. The quantitative part of this data collection has to be statistically representative for the territory and the population that the EES under investigation refers to, as our tool should allow for comparability across regions and overall reliability.

Our attempt is conceptually connected to entrepreneurship research projects such as the Global Entrepreneurship Monitor (GEM) project (primarily dedicated to country comparisons, see Bosma, 2013), as well as the Regional Entrepreneurship and Development Index (REDI)

project for 124 NUTS regions in 24 EU member countries (for the most recent report see Szerb et al. 2017). However, compared with these projects, our attempt more explicitly addresses the ten SECs described in section 5.3, and, to a degree, the systemic character of an EES.

Fig. 5.2 illustrates our understanding of an EES as a system of Stam's interdependent "conditions" measurable in a specific sub-national territory that is influenced by more general framework conditions of that very region and that may exert effects on entrepreneurial activity, and subsequently on entrepreneurial output and socio-economic outcome, with the latter having an impact on the regional framework conditions, thus closing the circle. It is important to note that each individual EES has its specific manifestations of the ten conditions, but it is also embedded in a regional context with region-specific (but non-entrepreneurial) factors having an impact on each of the EES conditions (left part of figure 5.2). As a result, each EES impacts the social values concerning entrepreneurship (e.g. whether or not self-employment is socially accepted in a region, see Kibler, Kautonen and Fink 2013) as well as the entrepreneurially relevant attributes of the individuals living in an EES, such as psychological (e.g. traits like those measured by the Five Factor model, see Obschonka and Stuetzer, 2017) or motivational ones. These attributes also influence each other within a region, for example through positive (or negative) role models that may lead to an increasing (or decreasing) propensity of the local population to start a firm (see Wyrwich, Stuetzer and Sternberg 2016) (central part of Fig. 5.2). Quantity and quality of entrepreneurial activities are a direct effect of the processes and attributes explained previously. From a government policy perspective, the output and outcome of entrepreneurial activities are most relevant. The majority of policy-makers are not really interested in large numbers of entrepreneurs per se, but rather in the postulated positive impact on regional economic growth (outcome) and the impact - also postulated - on the well-being or even happiness of the local population (which consists of taxpayers and voters) (see right and upper part of Fig.5.2). The higher the achievement rate is on the outcome section, the more favourable the general regional framework conditions are that act as efficiency enhancers or basic requirements for the EES itself.

Figure 5.2: Relationships between regional framework conditions, entrepreneurial eco-system and entrepreneurial activities



5.4.2 Assessing the Core EES Conditions

Our basic idea is to empirically assess the ten SECs. This assessment is based on perceptions of those living in the EES territory and/or those who are entrepreneurial experts for this very region. Current and/or previous and/or emerging entrepreneurs also belong to these addressees of related surveys, but data is not restricted to the opinions of entrepreneurs. Instead, a representative section of the local population (thus implicitly including entrepreneurs, non-entrepreneurs, young and old people, highly and poorly educated people etc; this survey is to be called Adult Population Survey = APS) as well as a limited number of local experts (Regional Expert Survey = RES) will be asked for their perceptions regarding some aspects of each of the ten SECs. If resources are available, these surveys should be replicated at regular intervals in order to allow for inter-temporal comparisons and to supply better weights with each additional year of data collection.

In the following section, we propose a number of variables/questions to cover the SECs. Please note that the variables partially refer to well-established questions used in the GEM for many years. Many of the variables/questions, however, have been newly designed and pretested in four sub-national regions in late 2017 (two each in Germany and Spain). The feedback received from these pre-tests has resulted in several modifications of both the original EES questions and the original RES questions.

For three of the ten SECs, this paper presents questions that cover the most important aspects of each of these SECs (see tables 5.1 to 5.3). The SECs "talent", "leadership" and "culture" are selected as examples in order to show how this paper's attempt to measure an EES works. For each SEC, a combination of RES questions and APS questions is proposed. The variables based on these questions are categorical, with either nine (RES) or five (APS) categories of affirmation to a given statement or question. The three SECs selected are considered to be amongst the particularly relevant ones for an EES according to the EES literature. The regional entrepreneurial culture often has an important impact both on entrepreneurial intentions and on the relationship between intentions and activities (see Kibler, Kautonen and Fink 2014) or on the interdependencies between local fear of failure and role model effects as relevant determinants of an individual's propensity to start a firm (see Wyrwich, Stuetzer and Sternberg 2016).

As shown in table 5.1, the culture of SECs is covered by nine questions, five of which address perceptions of the local population (one of these is restricted to entrepreneurs), while the others

are based on entrepreneurial experts within the respective sub-national region. The cultural attributes considered include the social (and regional) legitimacy of innovation, of entrepreneurship and of new firms, but also the quantity of entrepreneurship-supporting policies on the part of relevant organisations.

Tab. 5.1: Questions to cover the EES condition "Culture"

Question or variable content	No. of values	Survey
Most people in your region are supportive of individuals who are interested in becoming entrepreneurs.	5 or 9	APS+RES
Would fear of failure prevent you from starting a business?*	5	APS
In your region, most people consider starting a new business a desirable career choice.	5	APS
In your region, those successful at starting a new business have a high level of status and respect.	5	APS
In your region, you will often see stories in the public media and/or internet about successful new businesses.	5	APS
In your region, new ideas and innovative products are generally well received and adapted.	9	RES
In your region, large established firms are supportive of high-growth start-ups, pursuing a long term interest or investment rather than hostile or short term motives (takeover to shut down, dismantling, etc.).	9	RES
In your region, there are many events for start-up entrepreneurs, such as meet-ups, pitch days, start-up weekends, boot camps, hackathons and competitions.	9	RES
In your region, new and growing firms can enter markets without being unfairly blocked by established firms.	9	RES

* this question to be answered by non-entrepreneurs only

As Stam (2015) put it, talent is a necessary condition for the existence of an EES. Talent is associated with the innovativeness of the (potential) incubator organisations located in an EES (like incumbent public or semi-public research institutions such as universities and others), their openness regarding spin-offs, or the quantity and quality of skilled labour. These factors may be crucial in terms of the rivalry between new and small firms and large incumbents, for example when it comes to wages for highly skilled employees required by new as well as by established firms. As the latter aspect is rather specific to entrepreneurs, our three suggested APS questions will be addressed to young, emerging or established entrepreneurs only (but not non-entrepreneurs, see table 5.2). As the experts know the situation in the respective region very well, the focus of their questions is on the local standing of new and innovative (and usually small) firms (implicitly compared with incumbents) in terms of innovation and affordability of skilled labour. The latter issue will be covered by one question for each of the

two target groups. This enables a comparison between the perception of the entrepreneurs and those of the experts.

Tab. 5.2: Questions to cover the EES condition "Talent"

Question or variable content	No. of values	Survey
There is no shortage of the types of employees you need for your business in your region.*	5	APS
You can afford to hire the employees you need for your business locally.*	5	APS
You are satisfied that the skill levels of people in your region are sufficient for your business needs.*	5	APS
In your region broad array of highly skilled workers is available for new and growing firms.	9	RES
In your region higher education institutions ensure the workforce for new and growing firms is sufficient in quality.	9	RES
In your higher education institutions ensure the workforce for new and growing firms is sufficient in quantity.	9	RES
In your region, highly qualified young people tend to stay within the region.	9	RES
Your region is an attractive location to move to for people with the skills needed by new and growing firms.	9	RES

* this question to be answered by entrepreneurs only

Most of the EES literature argues that entrepreneurial leadership is an important aspect of a proper EES (see Isenberg 2010). In contrast to other concepts of entrepreneurship (or innovation systems), entrepreneurs rather than public agents or organisations are considered to be the driving factors within an EES (see Malecki 2018). However, the leadership attribute has rarely been used in empirical attempts to measure an EES. One reason may be that it is a challenging task to gather empirical evidence on leadership other than case study data.

Table 5.3 proposes seven questions/variables, three for APS and four for RES, to cover important aspects of entrepreneurial leadership. Given the topic, most of the variables are related to the role of entrepreneurs or groups of organised entrepreneurs in the region. Also, two of the APS questions have to be answered by entrepreneurs only, as rather inexperienced entrepreneurs in particular who are starting a firm for the first time search for and/or need assistance during the pre-entry and early stages of the entrepreneurial process (although not each entrepreneur accepts that he/she needs advice, see Brixy, Sternberg and Stueber 2013). We address this aspect with two specific questions.

Tab. 5.3: Questions to cover the EES condition "Leadership"

Question or variable content	No. of values	Survey
How much was your decision to start your own business inspired by a start-up or business from your region?*	5	APS
How often do/did you receive advice for your new business in form of mentoring from established business founders in your region? *	5	APS
How often do you give advice in form of mentoring to new business owner-managers?	5	APS
In your region, at least one strong entrepreneurial group or individual with high economic impact is a visible part of an entrepreneurial community..	9	RES
In your region, there is a broad pool of well-respected mentors and advisors offering support for new and growing firms, acting for the long term rather than pursuing short time financial gain.	9	RES
In your region, public and private organizations cooperate with each other to enhance entrepreneurship in the region.	9	RES
In your region, the development of the ecosystem is constrained due to a single public or private organization or actor having too much power.	9	RES

* this question to be answered by entrepreneurs only

5.4.3 Indexing: an Opportunity to compare EES over Time and across EESs

While the questions and variables listed exemplarily in section 5.4.2 for three out of the ten SECs provide detailed empirical information, it might be helpful for comparative purposes (cross-sectional as well as longitudinal) to develop sub-indices for each SEC and to create a composite index for the EES as a whole (covering all ten SECs). In both cases, a solution for the weighting problem is needed. There are at least four weighting methods for creating an index. However, we suggest not going for the easiest one, an implicit equal-weighting of all variables to be included in a sub-index (e.g., the eight variables shown in Tab. 5.2 to create the sub-index "Talent") and an equal-weighting of all ten sub-indices to be included in the overall EES index. Equal weights are justifiable through neither theoretical nor empirical arguments and are as arbitrary as weighting the elements according to personal opinions regarding their relevance. A second option would be to weight the SECs using a principal component analysis. Under the assumption that the EES composite score is a principal component derived from the interaction of the ten SECs named, a principal component analysis is done to estimate the correlation between each SEC expressed as a re-scaled score (each contributing 10% of the total score) and the latent composite index. The correlation coefficients will act as weights. The third method is to weight the SECs using a multiple regression analysis. Different types of variables capturing various indicators of entrepreneurial activities presumed to be EES-related may be chosen as dependent variables. Additionally, the composite index may be used as a dependent variable to check that all re-scaled SECs explain the composite index perfectly. Regression analysis is an appropriate method for discovering the impact of each individual component on

the overall sub-index. This method, however, has some restrictions. One is the inaccuracy when it comes to non-linear causal relations. Additionally, the design of the individual index components has an impact on the explanatory capacity of the SECs towards the overall index.

The fourth method is a crisp set qualitative comparative analysis (csQCA), possibly conducted as a fuzzy set analysis (fsQCA). In short, a crisp set analysis establishes an outcome that is determined by a set of SECs or factors. Similar to regression analysis, the outcome acts as a dependent variable and the SECs act as independent variables. QCA, however, is not based on correlation but on Boolean algebra. QCA results are combinations or 'recipes' of SECs that result in the proposed outcome. They are not linear combinations as in a regression analysis, and there can be more than one valid combination for producing the output. Additionally, a QCA of the different recipes provides the information needed to distinguish between necessary conditions (those that are common to all recipes) and sufficient ones (those that appear just in some combinations) to achieve a certain outcome. Only this information enables the researcher to assess the importance of conditions (i.e. their weights) for specific regions, and it allows to consider the complex differences between sub-national territories. QCA shows how many different formulas are present in the selected sample to achieve the target outcome (see Coduras, Clemente and Ruiz 2016, Khedhaouria and Thurik 2017, Kraus, Ribeiro-Soriano and Schüssler 2017).

QCA can be conducted for two different kinds of sets. Crisp sets require dichotomous variables, while the more advanced fuzzy sets do not suffer from this limitation. The method is built upon using measurements of coverage and consistency. There are three types of coverage. Raw coverage indicates the proportion of regions that are covered by each combination provided by the selected solution (trivial, intermediate or complex), taking into consideration that one region can be present in more than one combination. Unique coverage indicates the proportion of regions covered by each combination of the solution not being covered by the alternative combinations. Solution's coverage indicates the proportion of regions covered by the selected solution, usually formed by more than one combination. These measurements will be useful for assessing the importance or weight of the SECs for achieving an output expressed as a concrete value of the composite index on EES. Also, the consistency measurements will complement this assessment, providing the degree to which the selected solution as a whole is a subset of the outcome.

The presence or absence of the SECs in the combinations as well as the proportion of regions covered and the evaluation of the conditions as necessary, sufficient, necessary but not sufficient, and necessary and sufficient, will determinate the importance of each SEC. Fuzzy sets, if applied instead of Crisp, are expected to refine coverage and consistency measurements, which evaluate the quality of the solutions provided (similar to r^2 in regression analysis). Also, a QCA based on fuzzy sets is expected to result in more accurate weights compared with crisp sets. This paper, in principle, recommends using QCA based on fuzzy sets to build a composite index.

The same method can be applied for calculating an overall composite EES index (EECI) for the whole EES based on 72 questions (24 of which are covered by the three SECs included in tables 5.1-5.3). The composite index is a sum of scores calculated from weighting the individual SECs' scores:

$$EECI = b1 \cdot NT + b2 \cdot LD + b3 \cdot FN + b4 \cdot TL + b5 \cdot KW + b6 \cdot SV + b7 \cdot FI + b8 \cdot CT + b9 \cdot PI + b10 \cdot DM$$

with:

EECI = Entrepreneurial Ecosystem Composite Index

NT is condition "networks" with 9 variables: (re-scaled total score given by n1 to n9 variables)*weight b1

LD is condition "leadership" with 7 variables = (re-scaled total score given by l1 to l7 variables)*weight b2

FN is condition "finance" with 9 variables = (re-scaled total score given by f1 to f9 variables)*weight b3

TL is condition "talent" with 8 variables = (re-scaled total score given by t1 to t8 variables)*weight b4

KW is condition "knowledge" with 4 variables = (re-scaled total score given by k1 to k4 variables)*weight b5

SV is condition "support services" with 8 variables = (re-scaled total score given by s1 to s8 variables)*weight b6

FI is condition "formal institutions" with 8 variables = (re-scaled total score given by i1 to i8 variables)*weight b7

CT is condition "culture" with 9 variables = (re-scaled total score given by c1 to c9 variables)*weight b8

PI is condition "physical infrastructure" with 5 variables = (re-scaled total score given by p1 to p5 variables)*weight b9

DM is condition "demand" with 5 variables = (re-scaled total score given by d1 to d5 variables)*weight b10

fsQCA analysis is recommended to assess and calculate the weights b1 to b10. Calculating the EECI fragments from SECs' variables (NT to DM) will lead to the availability of dashboard sub-indexes for every SEC. The respective sub-index will be the result of the addition of scores obtained for each variable involved in the sub-index, re-scaled and weighted. In this way, every re-scaled sub-index will represent a maximum score of 10 points, making comparison of different SEC status levels possible. Since the ten SECs are re-scaled to 10, the maximum score that the EECI can reach is 100 points.

5.4.4 Comparing EES over Time and to each other

The proposed attempt offers the opportunity to compare EES across sub-national regions using the same methodology. Such comparisons may be based on the EECI as defined in the previous section, i.e. considering the complete set of conditions as suggested by Stam (2015). Furthermore, these comparisons may additionally consider each individual sub-index dedicated to each of the SECs. This would allow the discovery of the comparative strengths and weaknesses of a specific EES relative to those of other EES in the same country - or even in other countries if the same method is applied there as well.

The attempt also allows for inter-temporal comparisons of the same EES, but in different years. Again, these comparisons over time may consider the development of the overall EES by just looking at the EECI. By additionally comparing the ten sub-indices over time, it is possible to distinguish SECs whose performance is improving from those that lose strength in relative terms (compared to the other SECs) and/or in absolute terms (measured by the level of sub-index values). Of course, the longer the time series is, the more valid the results are.

Both kinds of comparison provide valuable insights for policy-makers to improve specific SECs or to capitalise externally on comparative strengths.

5.4.5 Assessing the systemic Character of an EES

A weakness of any kind of EES index calculated is that the systemic nature of an EES is not measured explicitly. Part of the reason is that connectivity between system elements and agents is still difficult to cover with reasonable indicators and appropriate data (see also Stangler and Bell-Masterson 2015). While no other EES index attempt is currently able to solve this problem, using fsQCA to develop categories of SEC combinations gives the suggested method an advantage in this field for measuring the different systemic settings of an EES at least indirectly.

By asking members of the respective EES for their assessments of the SECs, the method at least allows the recognition of what some EES actors think about some of the potential connections between other agents within this EES. See the final section for further recommendations for future research.

5.5 Conclusions and future Research

We are convinced that the biggest research gaps in EES research are in comparable empirics. While a valid, testable and profound theoretical basis is a necessary precondition for any kind of quantitative empirical study, the inductive way to modify or partially create theory is an indispensable counterpart of theory. Our paper proposes a framework for empirically measuring sub-national EES, based on Stam's ten conditions.

The proposed framework, if widely applied in different EES and for different time periods for the same EES, offers various opportunities and is characterised by some comparative strengths in contrast to alternative measurement techniques. Firstly, the proposed data collection and the indicators based on such data enable entrepreneurship researchers to unravel the complex relationship between attributes of an EES and (economically-relevant) attributes of the respective sub-national region. In particular, it might help to elaborate empirically on the output and outcome effects of a "good" EES in terms of entrepreneurial activities, regional economic growth, and, in the long run, the population's well-being. Secondly, the proposed techniques for calculating the weights for selected SECs are at least partially innovative, as they have not yet been used for such a purpose before. The fsQCA method may indeed help to calculate the weights for each of the variables more accurately in order to integrate them into one index per SEC. Thirdly, the proposed method is based on profound experiences with related attempts to measure entrepreneurship activities and their determinants for given territories. One lesson of the Global Entrepreneurship Monitor (GEM) research consortium is that primary data collection addressing national population (to assess entrepreneurial activities) and national entrepreneurship experts (to assess national entrepreneurial framework conditions) is a solid basis when elaborating on the effects and determinants of entrepreneurship of a given territory. Other attempts, such as the REDI project in some European countries, have already transferred the GEM idea to sub-national regions, also based on primary data, but without a dedicated focus on the systemic component indispensable for measuring EES. Our framework also stresses the collection of quantitative, primary data on a periodical (annual) basis at the sub-national level

and with a certain focus on systemic processes. The past attempts mentioned show that such surveys are feasible in principal and that research based on such data is accepted by many in the research community (see <http://www.gemconsortium.org/research-papers>). Fourthly, policy-makers and entrepreneurship consultants being active in specific EES will result in detailed insights into the strengths and weaknesses of their EES as a whole and several aspects within each of the ten SECs. This enables them to create demand-oriented, EES-specific instruments to reduce the weaknesses and to strengthen the strengths.

Considering these strengths, we believe that our suggested framework at least has the potential to fill some of the most important current research gaps in terms of EES. In accordance with Alvedalen and Boschma (2017) and Malecki (2018), these include, among others three research fields: comparative and quantitative EES research in general, comparing EES over time, and the direct addressing of the eco-systemness of an EES.

Our framework is not without challenges:

Firstly, our proposed method requires significant resources. As can be seen with the reference projects mentioned, such as GEM, collecting cross-sectional, statistically representative survey data for territories is a costly endeavour. Not every sub-national region will be able to invest in such projects. However, that which has successfully been practised for almost 20 years in GEM (country teams have to attract considerable resources each year in order to conduct two surveys annually - and 50 to 75 teams do so every year) should also be achievable in some large sub-national urban areas with ambitious mayors, entrepreneurial leaders or influential scholars. Our plea for applying the proposed method in order to improve existing theoretical thinking about EES requires a sample of EES large and representative enough for many kinds of sub-national regions in order to cover different countries. Selecting (by intention or by a lack of resources available) only a small and/or not representative sample may lead to issues of biased selection process that result in wrong conclusions for inductive theory generation (see Kalnins 2007).

Secondly, no immediate results should be expected for the comparisons, with a long-term perspective being required in order to enable researchers to conduct inter-EES comparisons as well as inter-temporal comparisons for the same EES. However, such comparisons are crucial (Malecki 2018) if one intends to avoid the often observed behaviour claiming that every region (and every EES) is unique - and therefore supposedly not comparable to others. Measuring alone only has a limited value but comparing with others makes the difference. Some kind of benchmarking or even ranking between EES of different countries and continents may be as

useful as an inter-temporal comparison using the same indicators for the same EES. Regional government policies that recently put EES rather high on their agenda expect clear empirically-based information about the specific EES and wish to compare them with others - measured using the same methodology, of course. This enables them to apply specific measurements in order to improve their EES and to learn from others. While the existing rankings do not fulfil the high requirements described above, this does not mean that rankings do not make sense at all.

Thirdly, for some specific attributes of an EES, it might be useful or even necessary to expand the empirical exercise to qualitative techniques. For example, if research intends to discover EES-specific bottlenecks to identify the role of certain individuals within an EES, face-to-face interviews, qualitative and repetitive, with various persons belonging to this EES are without alternative. Fourthly, while our attempt more or less addresses density, fluidity and connectivity as crucial aspects of an EES as proposed by Stangler and Bell-Masterson (2015), we may add some variables to capture the diversity dimension, their fourth aspect, too. Additionally, once EES data has been gathered it should be compared with existing measures of regional entrepreneurial vibrancy like the dealmaker approach by Feldman and Zoller (2012). The framework developed in our paper is considered to be an important contribution to the current literature on EES. It provides entrepreneurship scholars as well as economic geography scholars an opportunity to apply it to as many EES-related sub-national regions as possible. This endeavour may help to improve the currently rather weak EES theory through an inductive attempt at theory improvement. In fact, while considering Stam's idea of ten EES conditions to be more than helpful, we do not think that a well-accepted theoretical concept of an EES exists. The EES concept is indeed seriously under-theorised, despite so many recent academic publications. We believe that comprehensive, comparative and longitudinal quantitative research, case-wise supported by qualitative empirical research, offers a serious opportunity to generate an inductive EES theory. This, of course, requires a continuous interchange between empirics and conceptualisation, i.e. a long march, as van Maanen, Sorensen and Mitchell (2007:1149) put it: "*by generating explanations for their findings, researchers are forced to link their results to the conceptual plane and, by so doing, can then move back again to try to substantiate these post hoc interpretations by conjuring up consequences for them (i.e. more theory) and checking them out against the available empirical evidence they have in hand*".

6 The Road to Evidence based applicable Policies for regional Entrepreneurial Ecosystems

This Chapter is based on:

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Changes from the original paper include integration of additional tables (6.1, 6.5. and 6.6.) and minor corrections in the text.

Related appendices: D.1, D.2 and E

Abstract

Purpose: Entrepreneurial Ecosystems (EES) is among the fastest growing entrepreneurship research topics. With even greater vigour, the non-scientific world of economic development agencies, administrations and policymakers has adopted the construct and applies it widely “in the field”, often lacking a solid empirical foundation and pursuing sub-optimal approaches. Improving policy instruments for EES development requires a data driven approach to first understand an EES of a specific region before making any attempts to change it. The paper showcases an empirical approach to create empirically rooted EES policy implications, contributing to closing the gap for insight in regional EES data of sub-national regions.

Approach: Exploring a mixed method design, utilising quantitative Global Entrepreneurship Monitor data and combining them with EES stakeholder interviews, focusing on dysfunctions, redundancies, power asymmetries and cut off elements as well as in-layer division and public organisation behaviour.

Findings: One finding is, that regional economic development agencies (EDA), as a main public instrument to foster regional entrepreneurial activity, can have a potentially negative impact on EES bottom-up development and the ability to become self-sustained if they assume the role of competitors towards private organisations and businesses.

Research limitations: As other work on EES, the approach used in this paper only sub-optimally covers temporal system dynamics.

Practical implications: This paper contributes to future EES support policies being rooted in an empirical foundation and displays a number of specific policy implications. For example a transparent supervision and evaluation of the EDA needs to be implemented to avoid further wastage of tax money for ineffective instruments, marketing budget and competition with private businesses.

Value: This paper not only progresses the empirical basis for research on regional EES but also lays the foundation for specific policy implications for a sub-national level entrepreneurial ecosystem.

Keywords: entrepreneurial ecosystem, entrepreneurship, regional development, policy, endogenous growth, economic development agency, Global Entrepreneurship Monitor

6.1. Introduction

Entrepreneurial Ecosystems (EES) are one of the fastest growing bodies of literature in scientific entrepreneurship research right now (e.g. Credit, Mack and Mayer 2018). The non-scientific world of economic development agencies, administrations or policymakers also adopted the construct and applies it “in the field”, with vastly varying approaches, definitions, perceptions and results. While the topic became so popular that some started to see a system in every scenario in which entrepreneurial activity occurs, context undoubtedly matters for entrepreneurship as it can heavily influence performance and occurrence (Kibler 2013; Malecki 2009; Autio et al 2014 amongst others). Although being heavily researched, a considerable amount of EES conceptions is without empirical backup (Malecki 2018; Sternberg, von Bloh and Coduras 2019). A gap this paper aims to narrow significantly. Furthermore, until recently the concept was missing an empirical tool on which profound support instruments could be built. This gap has been closed by the Global Entrepreneurship Monitor (GEM) introducing their Entrepreneurial Ecosystem Index (ESI) (see Coduras and Hill 2020). As EES support binds finite region-endogenous resources, such as tax money or invested capital, only an efficient system helps to decrease resource wastage and optimise output in form of increased quantity and quality of entrepreneurial activity as well as self-accelerated positive growth processes of circular causality through such entrepreneurial activity. The goal of this paper is to explore the creation of a necessary empirical foundation for policy implications using the new toolset of GEM, the ESI, and supplement it with interview data. This methodology is applied to a sample region in Germany, thus a contribution to the empirical approach to EES analysis is made. As there are different definitions and perceptions of what an EES actually is, a brief one follows. The applied definition is based on Spigel (2015), Mason and Brown (2014) as well as Isenberg (2010):

A regional EES consists of all region endogenous organisations, institutions and persons, which actively contribute to the overall regional entrepreneurial activity as well as the processes and networks that are produced by the interdependent relation of all actors. The ecosystem is embedded in regional and extra-regional socio-economic and cultural context, which influences the ecosystems function, productivity and efficiency

Although there are diverging perceptions regarding the geographic scale of EES (Acs, Autio and Szerb 2014), the vast amount of EES internal processes is based on spatial proximity: networks, knowledge flow and spillover, cooperation, event participation, and identity (Spigel

2015, Sternberg, von Bloh and Coduras 2019). In this paper, the term region refers to a sub-national level spatial territory.

This paper will focus heavily on potential weak points and dysfunctions of existing EES using the example of the Region of Hanover (RoH) in Germany. Identifying possibilities for optimisation in EES is key to attribute funding more efficiently and effectively towards working policy instruments and interventions. Another major focus of this paper is on regional economic development agencies as facilitators or barriers to EES development. While public organisations in EES commonly are attributed the role of supplying frame work conditions and rulesets, in Germany they play a much more active role as the “traditional” overall low entrepreneurial activity lacks necessary momentum. Whether the public organisations should maintain an active role once EES growth has started or rather withdraw to make room for entrepreneurial leadership will be analysed in this paper. Furthermore, processes of EES (such as filtering potentially successful start-ups) and elements of composition of EES (such as cut-of elements and redundancies) will be reviewed using the empirical data.

The systemic approach to regional entrepreneurial activity poses general challenges in terms of empirical data collection (Autio and Levie 2017). The systems can be highly dynamic. Actors, who bind a lot of EES DNA in the earlier stages of an EES, can exit the EES without a chance for successors to inherit the DNA; there is inter-organizational fluidity of actors and highly interdependent processes as well as interlinkages with other regional, supra regional or, national EES. When taking a closer look towards the many different layers of EES, such as individual, institutional, administrative, political or spatial layers amongst others, in-layer-division becomes visible as well, having potential dysfunctions in an EES through organisation, institution or actor bound agendas or even animosities. All of this has to be kept in mind while searching for instrumental lever points to push the EES towards the next stage of development. The methodology applied in this paper explores the potential of the GEM ESI supplemented by qualitative interview data to overcome these challenges.

In their review of EES metrics Credit, Mack and Mayer (2018, 13) find, that despite a *multitude of available data sets* for entrepreneurship research, “[...] *there are important gaps at the sub-national level*” which we address with the paper at hand. By contributing to the entrepreneurship literature by specifically targeting such a sub-national region, testing out an applicable and accessible measurement tool by GEM and supplementing it with qualitative interview data we find transferable functions and processes in EES, which can be addressed

through policy instruments. After a brief overview of empirical methods in EES research (section two), a short introduction of the analysed region takes place (section three). This paper's methodological concept is explained in section four followed by reviewing results for each data set. Comparison and methodological as well as policy implications are drawn in section five and section six concludes, including further research.

6.2. Approaches for empirical EES Data

This paper will only briefly show some approaches for EES empirics, as there is very suitable work dedicated towards much more in depth reviews: Credit, Mack and Mayer (2018) composed a detailed overview regarding empirical approaches to EES. See Malecki (2018) for the current state of EES research and a detailed definition summary. See Stam and van de Ven (2019) or Sternberg, von Bloh and Coduras (2019) for a focus on the benefit of perceiving regional entrepreneurship as a system and the genesis of the EES approach. Regarding criticism of the EES approach, see Alvedalen and Boschma (2017).

Acs, Autio and Szerb (2014) create an EES index for the national level scale utilizing a vast amount of different data sources (such as Global Entrepreneurship Development Index – GEDI and GEM, amongst others). Their “*penalty for bottleneck*” approach however, does not credit the multitude of different factor combinations a successful EES could display. Although GEDI and standard GEM data are successful and proven tools to compare entrepreneurial activity between nations, they lack applicability for the EES concept, especially on a regional scale. GEDI and its regional variant REDI suffer from requiring publicly available data accrued by other organisations, falling short regarding applicability and accuracy (see e.g. Audretsch and Belitski 2017).

An early diagnostic tool for EES is supplied by the Aspen Network (2013). The toolkit helps to gain knowledge on an EES in different determinant categories, quite similar to Stam's (2015) ecosystem conditions but with a special focus on business support and lacking the leadership condition. The approach supplies an indicator sheet sourced from secondary data and a questionnaire for primary data collection. Although combining secondary data with a region specific survey is a step in the right direction, the approach depends completely on the availability of secondary data, dictating both spatial unit of analysis and the possibility to analyse an EES.

Taich et al. (2016) used an approach by Stangler and Bell-Masterson (2015) to develop a method measuring EES vibrancy through the categories density, fluidity, connectivity and diversity. Although they applied a loose definition - “[...] *each activity that facilitates entrepreneurial growth is a component of this ecosystem*” (Taich et al. 2016: i) - the mixed-methods design approach is viable. However, the statistical analysis suffers similar restrictions to the example before. Furthermore, the categories of analysis are more of meta-level performance indicators, less fit for deriving specific policy implications.

A substantial approach to EES policy creation comes from Autio and Levie (2017) with their analysis of a Scottish EES. While comparing with other policy approaches to complex socioeconomic systems, they find parallels like stakeholder engagement, reciprocity or collective action (Autio and Levie 2017: 3). They conclude that policy approaches using EES stakeholders should yield more precise and effective results for policies. Engaging stakeholders and analysing the EES for reciprocity as behaviour are key factors that were applied in this paper’s methodology as well.

Most approaches are hardly comparable due to differing methods and spatial scale. Output related measurement seems to underperform in regards to determine early-stage entrepreneurial activity and sustainable support structures (e.g. Acs, Autio, and Szerb 2014). The more promising results seem to be produced by mixed methods approaches (e.g. Taich et al. 2016; Napier and Hansen 2011) although most of the time suffering regarding variable fit up and availability of the quantitative side or depth and broadness of the qualitative side.

Quantitative-only or secondary data approaches, although more cost-effective, cannot cover the complex and region specific element compositions, especially not for a smaller spatial scale, even when the applied theoretic background is suitable (Stam 2018). See Credit, Mack and Mayer (2018) for an overview regarding the limitations of EES metrics and data sources.

As this paper focuses on laying the groundwork for policy implications, data quality plays a crucial role. As Vogel (2013, 443) put it: *“In order to build effective entrepreneurial ecosystems, we need to understand the components and assessment indices of such ecosystems.”* Adding an additional layer of information over the ESI data will allow for a much finer grained picture. Many EES approaches focus heavily on “productive” entrepreneurship or scalable start-ups (Stam and Spigel 2018) in line with the argument of Shane (2009) that only high growth start-ups should be pursued. This paper’s understanding is closer to the counter argument provided by Morris, Neumeyer and Kuratko (2015), that also smaller, *“non-high*

growth” new businesses add valuable economic contributions towards a region. In light of policy instruments, a heavy focus on unrealistic high growth start-ups could damage the incentive to start a new business to begin with and lead to a decline in overall regional entrepreneurial activity.

6.3. The Region of Hanover as a Test Field: Entrepreneurial Activity

The Region of Hanover (RoH) is located in the German Federal State of Lower Saxony. The majority of the population of the 1.15 million inhabitants lives in urban and suburban areas. The EES of the RoH is focused on the city of Hanover as most start-up activities are taking place there. Although self-employment and new firm formation are also occurring in the surrounding municipalities, potential entrepreneurs seek help from the regional economic development agency located in the city. *“The regional economic development agency supports entrepreneurs by providing them with seminars, events, venture capital, coaching and consulting amongst other activities. Although it is still relatively small compared to other German EES, such as Berlin or Hamburg, the EES in Hanover has shown strong growth and development in the last years”* (von Bloh, Coduras, and Sternberg 2018, 44). With entrepreneurship being an urban rather than a rural event (Bosma and Sternberg 2014), the focus on the city of Hanover is not unusual.

Table 6.1: General statistics for the Region of Hanover

% of gainfully employable persons that are unemployed	7,1
% of employees in primary sector	0,2
% of employees in secondary sector	20,2
% of employees in tertiary sector	79,6
population size	1.15 million
population density (capita/km ²)	502
GDP per capita (in €)	44700
average household income per capita (in €)	1798
median income per month for full time employee (in €)	3387
self-employment in % of gainfully employable persons	8,0

Both city and region (as an entity) have an individual economic development agency (EDA) on their own, however, the vast majority of entrepreneurship related issues is outsourced to hannoverimpuls. An important distinction has to be made: Whenever this paper refers to the

regional EDA, it relates to hannoverimpuls, not the EDA of the spatial entity Region of Hanover. With more than three million euros in labour-costs and over ten million euros in combined costs (both annual), the regional EDA hannoverimpuls is quite heavily (publicly) funded and, in theory, well equipped to foster entrepreneurship and ecosystem development within the RoH (see www.bundesanzeiger.de for balance information and annual accounts). Although the regional EDA has some subsidiaries, which divide the focus towards other tasks, the main mission of the regional EDA is to foster regional entrepreneurship and entrepreneurial capacity of the RoH.

In 2017 there were 405 business foundations consulted by the EDA - 771 persons were consulted in 1203 consultancy appointments. Besides direct consultancies, there were 3466 participations (with multiple participations by the same persons) at seminars, which teach a wide variety of self-employment related knowledge and skills. This data was sourced directly from personal of the regional EDA. Related to funding and a regional population of over a million inhabitants these numbers do not outright impress. However, evaluation of effectiveness or even efficiency by input-output models on an annual basis is not suitable as the EDA heavily invests in start-up and self-employment sensitisation of the RoH inhabitants (and not only those). Such investments are not prone to show during the short term and cannot easily be operationalised for evaluation of effect.

When comparing representative regional oversample data from GEM for the RoH with the German average, it shows that the total early-stage entrepreneurial activity (TEA) of the RoH improved from being lower than the German average (despite being an urban area) to slightly supersede the German average from 2012 to 2018 (see table 6.2). Oversampling is necessary due to otherwise low sample sizes in GEM for singular regions. In the 2018 GEM regional oversample for the RoH, 3.9% of respondents were actively involved in a start-up effort and owner of that start-up effort but had no wages yet (a subsample of TEA). If the value of 2017 is assumed to be close to the 2018 value, the above-mentioned 771 persons that were consulted by the EDA are roughly 1.72% of the amount of people who were trying to found a new business. This should be improved. Noteworthy is that an undefinable amount of those cases might not be from within the RoH, as a part of the EDA is specialized on supporting female entrepreneurs and does so in a much larger geographic area than the RoH. It is not clear whether those cases from outside the region are counted towards the consultancy statistics of the EDA. Unfortunately, this kind of in-transparency is no singularity, as the interview data will show.

Table 6.2: RoH GEM variable development between 2012 - 2018.

	RoH 2012	Germany 2012	RoH 2018	Germany 2018
Sample size: n =	2,004	4,300	1,133	4,250
TEA: yes %	3.88	5.28	5.03	4.94
Knows entrepreneur: yes %	25.53	24.42	20.92	23.52
Has knowledge & skill: yes %	40.70	37.40	42.97	38.03
Considerable career choice: yes %	46.91	49.52	53.96	49.60

“TEA”: Total early-stage entrepreneurial activity: active start-up effort or owner manager of a young business up to 42 month

“Knows entrepreneur”: Do you know someone personally, who started a business in the past 2 years?

“Has knowledge & skill”: Do you have the knowledge, skill and experience required to start a new business?

“Considerable career choice”: In your region, most people consider starting a new business a desirable career choice.

With the above stated region specific information, the RoH is neither under- nor overperformer regarding EES in Germany being an ideal test piece as there is an EES already developed enough to identify options for improvement but not too developed to be self-reliant and out of reach from policy instruments. Due to its supposedly low deviation from an average developing EES, the RoH might serve as a reference point for further research in more and in less developed ecosystems.

6.4. Method and Data

Two data sets were used as a basis to discover weaknesses and potential for optimisation within the RoH EES. The method design serves both as in depth analysis of the RoH EES and exploration of method complementarity to develop evidence based policy implications. With mixed method approaches, multiple goals can be pursued. To find a methodological approach that is transferable to other regions, two independent empirical data sets were created to test for the potential of a sequential design, correction for method induced biases, controlling results as well as complementary explanation. The first, quantitative, data set is the Global Entrepreneurship Monitor's Entrepreneurial Ecosystem Composite Index (ESI) and its composing variables for the RoH. The second is a qualitative data set build from stakeholder interviews in the RoH.

6.4.1 Entrepreneurial ecosystem composite index (ESI): Quantitative EES data

The ESI was used to create information surveying both the standard population and entrepreneurs, using an adult population survey (APS) and experts using a regional expert survey (RES). The genesis of the architecture of the index and its calculation can be reviewed in von Bloh, Coduras, and Sternberg (2018). For the final version, see Coduras and Hill (2020). The version applied 2018 in the RoH for this paper is not identical with the last iteration reviewable in Coduras and Hill. The index was successfully applied in a number of entrepreneurial ecosystems in different countries and shows reliable and comparable data for EES (for more information see www.gemconsortium.org).

The [ESI] is an index created to operationalize contextual conditions of subnational (or regional) entrepreneurial ecosystems through evaluation of ten condition categories [...] allowing for comparison of EES despite potentially different factor or condition quality compositions. [...] These conditions are: networks [NT], leadership [LD], finance [FN], talent [TL], knowledge [KW], support services [SV], formal institutions [FI], culture [CT], physical infrastructure [PI] and demand [DM] (von Bloh, Coduras, and Sternberg 2018, 8). For a more recent description of this elements, see Stam and van de Ven (2019).

Conditions are covered by a mixture of specially tailored questions and standard GEM variables. There are up to 15 variables per condition sourced from both regional adult population survey and regional expert survey. Differences lie within the methods, as the adult population survey is done by phone interviews while the expert survey is conducted online. The variable scores are built into sub-indices using rescaled variable scores for each ecosystem condition, which are then weighted and aggregated into the final index. The score can range from zero to ten. A minimum score would negate the existence of an EES while a perfect score would indicate ideal and most productive conditions for entrepreneurial activity within the region.

All RoH ESI data collection took place between June and September 2018, coinciding with most qualitative interviews. Both surveys were pretested and refined before data collection. The ESI APS sample of the RoH consist of 1,133 respondents. To gain statistical representativeness for the regional sample of adults aged between 18 and 64 years in the Region of Hanover, and of all 21 municipalities, a mixture of fixed line and mobile phone surveys covered all relevant age and gender combinations. 55.7% were fixed line, 44.3% were mobile phone surveys. A mix of sampling from a list and random digit dialling sourced the phone numbers. Cases received

weights based on age, gender, education, binary municipality affiliation (city of Hanover vs. surrounding municipalities) and household size.

95 experts have been invited to complete the regional expert survey, 45.3% responded with participation, which led to a sample of 43 completed online surveys. The participants have an average of 9.8 years of (self-estimated) experience in the area of entrepreneurship. The sample is quite evenly distributed between public and private organisation actors and consist of entrepreneurs, start-up consultants, economic development agents, financiers or bank employees, administration employees, professors engaged in entrepreneurship, higher education institution employees, chamber employees, co-working space employees and business owner-managers. Each of the ten above quoted ecosystem conditions was covered by at least three experts.

6.4.2 Stakeholder Interviews: Qualitative EES Data

In total, 35 interviews with 48 different persons were conducted. Interview time varies between 26 and 89 minutes with an average of 64 minutes and 38 seconds. For ten of the 35 interviews recording was not permitted, all others were recorded, 26 hours of audio material were created. All interviews were conducted from mid-2017 to early 2019 with the majority done during fall 2018. In most cases, the interviewees were already familiar with the ecosystem terminology. Table 6.3 shows the number of interviews in each stakeholder category.

The style of the interviews started out as semi-structured with a stakeholder category specific questionnaire but the first preliminary test interviews showed that a more open approach would be a more suitable fit. While the singular question items were discarded, the question blocks were kept as guidelines for the interviews. The blocks covered the areas “founding in the RoH”, “barriers”, “involved organisations”, “EES: perception, missing elements and community”, “collaboration”, “networking”, “events”, “financing”, “administration and bureaucracy”, “economic development agencies and instruments”, “market failure”, “politics”, “actor power distribution”, “leadership” as well as “entrepreneurial activity and culture”. Interviews have been conducted in German, citations in this paper are translated from German to English by the author. The interviews are listed as I1-I35 with no differentiation between interviewee subgroups to maintain anonymity. The finite amount of EES actors in the RoH would allow for drawing conclusions quite easily. The numbering does not rely on any order.

Table 6.3: Interviews per stakeholder category

stakeholder category	number of interviews
entrepreneur	7
economic development agency/administration	11
banking/finance	3
consulting/chambers	4
higher education institutions	4
politics	2
accelerator/incubator/co-working	3
media	1

Interviewee group selection was firstly derived from theory. All relevant groups of stakeholders are present in the RoH. The final selection took place using different approaches with multiple levels in some cases: A meeting of an association of organisations promoting entrepreneurship in the RoH was used as an entry point. First interviewees were approached here. Additionally, to avoid lock-in at the beginning in a specific part of the network and as most of the present actors on this meet were from public organisations, an online search, differentiated for the groups of stakeholders was conducted. Other sources for interviews have been events and participation lists of events. Almost all interviews led to snowballing other interviews. To choose interviewees from politics, minutes from plenary sessions were searched for politicians related to entrepreneurship topics (see Nilas database, www.landtag-niedersachsen.de).

Interviews were conducted mainly at the location of the interviewee, in some cases at events and in one occasion by telephone. The interviews were recorded in most cases, transcribed and coded. Interviews without audio material have been summarised directly after conducting the interview and coded as well. Coding was done in a mixture of theory deduced codes and inductive in-vivo coding. The twelve code-classes were “culture and mindset”, “entrepreneurial activity”, “finance”, “formal institutions or bureaucracy”, “infrastructure”, “knowledge creation and diffusion”, “leadership and community”, “networks”, “policy and policy implications”, “support services and service providers”, “system” as well as “talent or workforce”. Each class has a number of sub-codes (see annex for code-tree) with a total of 49 subcodes and 612 coded interview passages.

6.5. Results

6.5.1 ESI Scores

The ecosystem conditions evaluated through the ESI show a mixed picture for the RoH. The overall score is slightly above the theoretical average. Within the ecosystem conditions, there seem to be strong differences in condition qualities (see table 6.4). Physical Infrastructure, Talent and entrepreneurial Culture are scoring high. With the federal capital at its core and numerous higher education institutions, a higher score in the first two conditions was expected. Scoring high in entrepreneurial Culture is a first hint at a functioning mind-set of an EES.

Knowledge and Support Services score below expectation. The medium score of Support Services, albeit the large and well-funded EDA shows room for improvement and needs to be reviewed for instrument misfit with market failure. Having Finance and Leadership as lowest scoring ecosystem conditions poses a serious threat to EES functionality.

Table 6.4: ESI Scores from 0: worst EES conditions to 10: perfect EES conditions

Index	RoH score
Overall ESI Score	5.26
Physical Infrastructure	6.63
Talent	6.58
Culture	6.43
Demand	5.54
Network	5.51
Support Services	5.33
Formal Institutions	5.18
Knowledge	5.06
Finance	4.79
Leadership	4.60

On variable level, specific strengths and weaknesses, as perceived by the respondents, can be made visible. The main weaknesses are within the Formal Institutions and Financing conditions. Bureaucracy has been a common criticism in Germany for years. The process of becoming self-employed requires not only abiding government rules and regulations but also in many cases chamber law.

While some regions in Germany, such as Berlin or Hamburg, by now have a healthy supply of business angels and venture capital, this does not seem to be the case for the RoH. Financing possibilities lack across business stages and forms of capital.

Table 6.5: EES strength and weaknesses as perceived by experts.

EC	Statement description	mean	std.dev
PI	High quality of physical infrastructure for new and growing businesses.	6.93	1.37
NT	Existence of an accessible and highly connected entrepreneurial community.	6.48	1.87
SV	Existence of an independent impartial organisation as first contact point for entrepreneurs.	6.43	2.25
CT	High quality and frequency of events for new and growing businesses.	6.40	1.80
PI	Affordable access to communication (phone, internet) for new and growing businesses.	6.39	1.84
NT	Public organisations effectively support new and growing businesses with events.	6.28	1.96
FN	Entrepreneurs have sufficient access to pre-start-up funding.	4.13	1.73
KW	Knowledge spills over from established businesses to new and growing businesses.	4.13	1.82
TL	Highly qualified young people tend to stay within the region.	4.11	1.75
FN	New and growing firms have sufficient access to funding from business angels.	3.94	1.66
FI	Government policies (e.g., public procurement) consistently consider new and growing firms.	3.11	1.57
FI	Government bureaucracy, regulations, and licensing requirements are no major barrier for new and growing businesses	2.90	1.89

Ranging from 1: no approval at all to 9: total approval

Table 6.6: EES strength and weaknesses as perceived by entrepreneurs

EC	Question description	TEA		OWNMGE	
		mean	std.dev	mean	std.dev
TL	Skill levels of potential employees within the region are sufficient for the business needs.	3.85	1.43	2.88	1.60
TL	Employees needed for the business are affordable.	3.80	1.24	2.64	1.60
PI	Satisfied with telecommunications, internet access and speed.	3.63	1.16	3.24	1.37
CT	Entrepreneurs receive a high level of reputation within the region.	3.55	0.97	2.71	1.34
LD	Receiving advice and mentoring by established entrepreneurs	2.22	1.39	1.68	0.97
NT	Usage of the supplied networking events within the region	2.12	1.03	1.70	1.22
LD	Regional entrepreneurial role models influenced the start-up decision	1.65	1.30	1.42	1.06
SV	Supported by a program in your region, which was aimed at business start-ups (e.g. an accelerator or incubator program).	1.42	0.93	1.52	1.16

Ranging from 1: no approval at all to 5: total approval. Sorted after TEA variable means. Entrepreneurs are: Nascent Entrepreneurs and owner-managers of businesses up to an age of 42 month (TEA) as well as owner-managers of established businesses over 42 months business age (OWNMGE).

The entrepreneurs covered in the adult population survey show low rates of being supported by programs that are aimed to push regional entrepreneurship. Additionally, they seldom become self-employed due to following role models. In the majority of the cases the entrepreneurs did not receive mentoring or advice from established businesses. The lack of role models or of their visibility and leadership within the RoHs EES is one major shortcoming at the time of data collection.

Within the expert sample of the RES mainly those variables, which are potentially controversial statements, show high standard deviations. The two highest deviations are displayed by the following paraphrased statements. The first states that there is an independent and impartial organisation as a first contact point for people who seek help with their self-employment or start-up (std. dev. of 2.25 on a 9-scale variable). The second statement claims that the development of the entrepreneurial ecosystem is not slowed or hindered by a private or public actor holding too much power (std. dev. of 2.33 on a 9-scale variable). The experts show most unity when it comes to statements regarding the physical infrastructure.

6.5.2 Stakeholder Interview Outcome

6.5.2.1 System analysis: EES functionality overview

The existence of basic EES elements is necessary for it to function. While not all elements need to be equally developed, some, such as financial capital, critical mass of entrepreneurs, networking or community, events and service providers for entrepreneurs, are rather crucial. The basic functionality of an EES is determined by whether a critical share of the different actors and organizations is capable of cooperation and collaborating engagingly rather than thinking and behaving in isolated organizational isles. Sharing of critical information is as relevant as reciprocity as an underlying, implicitly agreed upon maxim for behaviour. Acknowledging redundant supplies of events and services, as a potential to streamline and optimise the system should supersede viewing other organisations as a threat. For the RoH, the results are overall prone to be positive for this basic functionalities with noticeable exceptions when broken down to the level of who cooperates with whom. The goal is to complement and substitute each other (I1, I8). “*It is a give and take*” (I25), a statement that is challenged by a number of opposing views later. One should not start to sum up and compare “give” and “take” or else the cooperation would crumble quickly (I1). Reciprocity seems to be incorporated by most actors (I2, I8, I9).

Cooperation examples are that many organisations, such as communal EDA, some of the chambers and banks, send their entrepreneurs to the regional EDA which is specialised in consulting entrepreneurs and well equipped with both funding and employees (I3, I8, I9, I11; I22). This regional EDA plays a major role within the RoH EES, which can be summarised as such: The overall task is fostering regional entrepreneurial activity in both quality and quantity, reducing bureaucratic barriers through advice and supply of relevant information through sensitisation, offering coaching, training and education in seminars, consultancy at different stages, (co-)financing and (co-)organizing events. However, once new firms have outgrown their early stage, they repeatedly voice a lack of support as shown later with interview data. Additionally the regional EDA lays a special focus on supposedly disadvantaged population groups that are estimated to show the potential to increase regional entrepreneurial activity, such as female, and migrant entrepreneurs. Although most interviewees value the existence of the regional RDA, it is perceived quite differently by EES stakeholders regarding their range of activities: The public actor interviewees (others than of the regional RDA itself) are prone to be positive about the RDA while private actor interviewees tend to be more critical. Collaborating with the RDA would be working well, ranging from co-organisation to silent partnership (I7, I8, I9, I29). The supply of a support framework and training for (nascent) entrepreneurs as a service provider for other organisations, such as banks amongst others, is also well received (I8, I14, I15, I17, I21). *“We try to forward [(the entrepreneurs)] quite soon to hannoverimpuls. They are, so to speak, our back office and collected know-how”* (I15). The RDA is said to supply good instruments for support, to be present and active in the EES, to have changed into a better start-up mindset in the recent years and characterised as “could be relied upon” (I7, I8, I17, I24, I25).

Both accelerators in the RoH are well embedded in the system (I7, I9, I16). As one is located within the region’s most prominent co-working space, it lies at the core of the entrepreneurial heart of the EES. With a focus on private partners, the co-working space is not as heavily connected with organisations such as higher education institutions or the chambers (I3). The other accelerator is deeply intertwined with the regional EDA and one of the universities, as it shares employees (I26). The two existing accelerators service different target groups. One focuses on B2C, the other one mainly on B2B-Start-Ups (I3).

Although some actors from the public sector see support for business foundations and self-employment as high-cost but low-reward (I4), the topic receives, by now and in general, a lot more attention in regional politics, higher education institutions and media than it used to (I7,

I20, I26, I30). Those actors who are linked into the start-up community show clear signs of an entrepreneurial mindset and start to influence even some public institutions, which are more and more networked into the community (I14).

Networks between actors and organisations are a major cogwheel making an EES work. Networking events create serendipitous encounters, act as entry point for newcomers, provide the sharing knowledge and success, as well as build regional visibility of entrepreneurship itself. The EES network of entrepreneurs, public, and private stakeholders seem to be functioning, active and not sclerotic through openness for newcomers (I24). *“We all have the feeling it is worthy to weld this network together and to make it more transparent”* (I20). Although there are gatekeepers and clusters within the network, access is not exclusive. The main networking instrument within the EES are well received events. Attendance is usually high even when the events are not heavily advertised (I7). In terms of quality and quantity, there is a broad range from sensitisation events for entrepreneurship over nascent entrepreneurs and young businesses as target group to a well-received frequent fuck-up night. Scale Ups and growth stage businesses have to make do with the supplied events for early stage entrepreneurs, not always receiving the best support and networking possibilities (I7, I15, I26, I29, I31).

The geographic size of an EES, the population density as well as agglomeration and urbanisation advantages play an important role for the structure and function of it. As an EES is dependent on the ability of its actors to meet, take part at events or develop a certain identification with a given region amongst other effects, spatial proximity is a prerequisite and therefore an EES as understood in this paper can only exist in a sub-national region. The RoH EES shows a structure like a hub and spoke structure (see Markusen (1996) on this spatial pattern), where the city is the hub and the townships outside are connected to that hub by links to key actors, in most cases the regional EDA hannoverimpuls (I4, I9, I10). The main entrepreneurial activity is located inside the city, most seminars and services for entrepreneurs are as well (I29).

A functioning ecosystem also supplies different kinds of filters. The system needs to filter out hostile or destructive elements while actors need to filter the quality, and depending on that, the quantity of entrepreneurial projects within the region. Unsustainable business ideas that are harmful towards the individual economic state of the entrepreneur or others need to be rooted out or improved upon. One indicator hinting at whether the filter system of service supplied to nascent entrepreneurs works is, when entrepreneurs that have been consulted, have higher rates

of getting funding than those who approach the banks on their own. This cannot be confirmed for the RoH, as the picture seems to vary quite strongly (I11). Additionally, the share that receives debt capital from banks does not change over the years (I11). In general, consulting agencies, such as regional and communal EDA or higher education institution agents, try to discourage dysfunctional, unsustainable business ideas and models (I7, I8, I9, I11, I15, I28).

Physical infrastructure of the RoH is perceived as conducive. A major strength of the RoH is a quick connection to high-speed-trains, highways and airplanes. An entrepreneur could easily have appointments in both Hanover and Berlin on the same day (I14, I33). *“It’s a dream regarding the location here. ICE-connection [(high-speed-train)], highway connection or even flights. I always notice this when I have to get to customers, or even to Berlin. [...] I don’t have to live there to meet with three investors in the afternoon.”* (I29).

Entrepreneurial activity in the RoH 2018

- Total early-stage entrepreneurial activity: 5.03% of the population was either trying to found a new business or owns and manages a business up over 42 months.
- Register data for the recent years (2016-2018) shows slightly more business foundations, i.e. market entries than market exits (I4).
- With higher education institution based business foundations, the cooperation between the regional EDA and the LUH seems to develop with a healthy growth rate, at least for this university (I7). In terms of knowledge transfer at the university by IP transfer, there are but a couple of cases per year (I26).
- The regional EDA supports roughly 400 business foundations per year, a low share of the GEM TEA-rate (I9).
- Smaller communal EDA, scattered across the region, show low numbers of entrepreneurs, about three or four serious entrepreneurs per month (I15, I22).

6.5.2.2 System analysis: Deficiencies and dysfunction

The main effort of the qualitative empirics was focused on finding weaknesses, dysfunctions and redundancies in the EES of the RoH with the goal to develop problem based policy solutions and implications for improving the systems efficiency.

There seem to be no institutionalised meetings or information exchanges between all the

relevant actors on a regular basis (I1), which decreases efficiency in problem solving through unequally distributed information. There are plans to create a “round table” but those are not quite progressed (I7). In terms of policy creation and long-term strategy to build the regions entrepreneurial capabilities, there supposedly is no orchestrated set up of milestones: “[...] *what I miss is [this]: there's no conclusive strategy being followed. Everyone's a little fiddly on their own [...]*” (I30).

Complementing rather than competing is not the case for all organisations; especially chambers are more prone to keep a “*friendly truce*” with other organisations than to focus on cooperation based alignment of services (I1, I27). This becomes visible in similar seminars and events, which are offered by both chamber of industry and commerce and regional EDA for an overlapping target group.

A major shortcoming is the missing engagement of large established companies, although the RoH hosts some powerful MNEs. “*Large enterprises do not have regional bonus [...]*” (I1). Although the RoH’s most prominent co-working space and accelerator, was able to procure some regionally located MNEs as partners, this did not lead to a more pro-active involvement of those large firms in the EES.

With financing possibilities, the picture is not as clear. While some agree that “*if you need an investor, you'll find one*” (I7), other interviewees disagree. Especially when venture capital or growth stage capital is needed, the verdict is rather negative. In terms of finance institutes prone to support entrepreneurs, the EES is underequipped in both quantity and quality (I11). Spin-off financing works through national grants (I26, I29), and is in rare cases augmented by business angels. Venture capital is especially hard to come by (I9, I11, I14, I35). “*If I was looking for money now, I think it would be really difficult. I probably would have to go to Berlin immediately or something. I wouldn't know of a format here, where I could find several potential investors who operate on a scale with seven figures or more*” (I24) or “[...] *in the end, when it came to collecting capital and finding the right partners, we went to Berlin*” (I29). With growth stage capital, the gap in financing is most severe (I11, I16, I17, I29, I30). Financers act very risk adverse when evaluating debt funding (I6). “*We made the experience, that someone who failed [...] that those fails are based in the personality of the entrepreneur [...]*” (I11).

The development bank (NBank) of Lower Saxony, located in Hanover, does not seem to benefit the funding situation of the EES either. Entrepreneurs find dealing with the bank too bureaucratic, slow and not easy to engage (I23, I24). Despite the lack of financial capital, the

“MikroStarter”-instrument by the NBank, a low-level, no-security credit up to 25.000€, seems to be “*sitting on the shelves*” (I12, I35).

Regarding support services, the most prominent criticism is, that the publicly funded regional RDA acts as (subsidised) competition to private market actors, hindering their growth, and does not withdraw from areas which could sufficiently be covered by the market but instead tries to defend the position at the top of the EES (I3, I6, I11, I27). The regional EDA is perceived as too powerful, employing many people but being quite secretive about their actual output or induced effects, which seems to be suboptimal in regards to funding height (I3, I5, I24, I35). When entrepreneurs are forwarded to them by other organisations, the latter almost never receive feedback or are included in the support or founding process (I4, I15). If the organisations manage to get feedback from entrepreneurs they forwarded about the received support by the regional RDA, the entrepreneurs report mediocre treatment (I15). Another major criticism is the characterisation of the regional RDA as slow, bureaucratic, and thus unfit to support actual fast-paced start-up entrepreneurship (I3, I19). It is described as being “*too close to decision makers in administration and politics, that I don’t really know whether they [(the regional RDA)] actually could be agile, fast and brave*“ (I20). Private actors or organisations almost always need to cooperate with the regional EDA to receive federal funding, as they would have no chance of receiving it on their own (I3). Although this equips the regional EDA with an instrument for funding allocation and steering the development of the EES, it simultaneously cripples private initiatives before they can reach enough momentum to survive on their own.

A main issue, which is detrimental towards the systems efficiency, is the need for self-legitimation of existence by the public organisation’s managements. Success has to be attributable and claimable in order to procure or justify future funding, which results in fighting for the spotlight rather than setting the scene in the background (I2, I5, I6).

As entrepreneurship is a process, the system has to cater to the different needs of the stages during the firm founding process. Within the EES of the RoH, the focus is seemingly uneven and favours the early stages but lacks extensively in the growth phase stages. “*There is just this "Gründen heute" [...]. It's for those who are at the very beginning. I'm too far along for "Gründen heute". In the beginning it was super cool, I learned a lot. [...] And now there's nothing; not for my phase. I have a lot of problems as well. I'd like to talk to people on equal terms. And for my business level, there is almost nothing here. Hannoverimpuls is a really good place to start. But as soon as you have a few years on your back and it's already going well,*

you get nothing” (I31). Because of that, successful start-ups leave or had to leave the region and are no longer able to feed back into the system. May it be as role models, mentors or media attention creators, not mentioning the loss of economic strength multiplication (I7, I24, I29, I31, I34).

To end up with a vibrant EES, it needs to have an accessible entrepreneurial community, an entrepreneurial mindset and ways to distribute mindset, role-models and success stories inside and outside of the entrepreneurial community. It also is necessary for successful entrepreneurs to feed back once they have “made it”, by investing time, money or sharing knowledge with nascent entrepreneurs and young businesses. Overall the EES suffers in the aspect of backfeed (I8): “[*Established firms*] almost never remember where they came from” (I13). Quite a few interviewees voiced concern that engagement of established firms leaves to be desired (I9, I10, I18, I20). There are a few, quite influential examples of this in the RoH (I7, I14, I19, I20, I23). However, distributing regional success stories and role models through regional media is one way to foster a regional attentiveness towards entrepreneurship and ultimately an entrepreneurial mindset. Within the RoH, a chicken and egg problem is encountered regarding this issue as the region lacks larger success stories to which nascent entrepreneurs can aspire (I29, I31). “[...] *We are missing those three, four, five big success stories above us, were you would say ‘that’s where I want to be one day’*” (I29).

6.5.2.3 System analysis: Redundancies

Although redundancies, similar services and overlapping target groups of different organisations can be a vitalising factor in economic processes (as competition), they are harmful in certain areas of the EES, as region endogenous resources are not allocated in a way that they produce a maximum of support for nascent entrepreneurs, young and growing businesses.

When it comes to entrepreneurship education, specific courses and consulting, there are ineffective redundancies in the EES of RoH. Chambers, especially the chamber of industry and commerce, regional EDA and independent private business consultants are competing over entrepreneurs (I6, I8, I10, I11, I22). “*Let’s take the classic consultancy for business founding. Every chamber, hannoverimpuls, the region; I have independent public contractors who come here, who would like to offer this service, I have independent private consultants who would like to offer this service. I can basically start walking with a whole vendors’ tray of flyers*” (I22). And: “[...] *I sometimes get the feeling as if organisations like IHK [chamber of industry*

and commerce] and hannoverimpuls have a competition going on” (I11). While this would be a healthy fact for private businesses, for public and a semi-private organisation which forces businesses to become members and pay a membership fee, this is a dissipation in terms of tax and membership money. Additionally it is subsidised suffocation of other private initiatives to grow or spread in these market areas. Higher education institution start-up consulting departments partly add to the mix as well although their specialised portfolio of services is rather complementary (I21, I26).

6.5.2.4 System analysis: Cut off elements and fragmentation

Organisations that are cut off or isolated from the EES and networks cannot profit from or feed into it. While some organisations might deliberately choose to shield themselves from perceived competition, thereby forgoing specialisation benefits and comparative advantages, others might be isolated involuntarily for a number of reasons. Before suboptimal EES embeddedness receives a closer look, an important distinction has to be made. Within the RoH EES, there are two segments of entrepreneurial systems which are partly compartmentalised from each other but share some overlaps (I15). At this point, a nominal separation seems necessary to understand some of the comments. While there is genuine business founding support for “everyday” new firms, i.e. hairdressers, carryout or nail salons, a section of entrepreneurship, which is called “Existenzgründung” in German, there is also a system evolved around more digitalised, tech-affine and innovative start-ups. The latter will be called system S, the former system E. In terms of leading actors (Feld 2012) an EES requires role model figures or teams to which earlier-stage entrepreneurs can aspire to and actors that impact the direction and degree of development from within the EES. The leading actor with upmost centrality in system E is the regional EDA (I9, I14), despite leadership in an EES is mainly attributed to entrepreneurs by the current state of literature, not public organisations. The leadership in the start-up ecosystem S of the RoH can be attributed towards the major co-working space (I14), although the EDA also tries to cover ground in system S. The private co-working space is the gathering point of the start-up community. Its founders are also the closest thing the RoH EES has in terms of role models. The entrepreneurial community, which has developed over the last couple of years, is largely based outside of public organisations and is composed of a rather small but closely networked and invested group of individuals (I7, I14, I19, I23, I34). During events, one often encounters the same, open minded and welcoming people, which makes the core of the community quite accessible (I23). Overall, some actors and organisations are open to collaborations with numerous actors while others are mainly cooperating with few or even just

one other actor and in those cases often unidirectional.

In literature, EES are dominantly focused on innovative high growth start-ups (see Stam and Spiegel 2018), the reality in most “EES”, however, looks differently – at least in Germany. Unicorns are not just rare; they are a singularity if a region in Germany ever gets one. For regional economic development and endogenous growth, both systems are highly relevant. Start-Ups are needed to push creation and diffusion of new knowledge and to keep the pressure on established firms to innovate. “Existenzgründungen” are needed to supply livelihood, employment possibilities, everyday services for the population, overall amenities and slow, but incessant economic renewal. Both chambers, the chamber of commerce and industry and the chamber of crafts are not well embedded in system S (“*a successful start-up entrepreneur does not ask the IHK [chamber of industry and commerce] for advice*” I14). This seems to be also the case for system E with some specific actors as exception (I7, I24). “*My impression is, they [the chambers] play their own game. They are stuck in a bottle from which they do not want to emerge*” [I27].

Although improving, some parts of financing lack a broader cooperation with other organisations. Especially the connections between higher education institutions and the financing sector are not tight (I7, I11, I17). The veterinary school, music school and medical school are, at the point of the interviews, still quite disconnected from other EES organisations and actors, in both system S and E. “[...] *These [collaborations] are still delicate flowers. I think [there is] a long way to go before a cooperation like Starting-Business with LUH can be developed*” (I9). “Starting Business” is a successful and well-received cooperation between the regions’ major university and the regional EDA hannoverimpuls. An increased system embeddedness could potentially create a rise in spin-off quantity and quality from both higher education institutions, as they could benefit from the experiences of the other, overall better connected ones (I1, I7, I9).

Overall, there are quite a few organisations that have to go through the gatekeeper hannoverimpuls to get access to the EES, which decreases speed of diffusion for information and potential partner finding while allowing the EDA to create a better fit, albeit based on their perception.

6.5.2.5 System analysis: linkage with other EES

To prevent lock-in and in-bred institutions, the EES should be linked with other regional EES.

Linkage with systems embedded in different cultures, e.g. through migrants, could additionally improve the inflow of new ideas and routines (see von Bloh et al. 2019). The EES of the RoH shows some connections to other systems. Through entrepreneurs, the EES is connected to companies and EES in Berlin, Luxemburg, France as well as Prague and knowledge is “imported” from Israel or USA in areas such as cyber-security (I19, I27). This is by no means a conclusive listing; however, in total the out- and inward linkages of the EES are on a lower level. At the current stage, the degree of linkage to other EES is probably sufficient, as it shields the system from too much direct competition it probably could not withstand.

6.5.2.6 Internal contradictions within the interview data

Based on actor affiliation, there are notable divided opinions, especially on some of the most relevant system attributes. Most actors of the EDAs see less competition in servicing the entrepreneurs but rather a shift towards service providers complementing each other. Some entrepreneurs however, argue that the EDA is not a neutral and impartial organisation but that it rather acts as competitor defending the claim to EES leadership. This finding coincides with the ESI expert survey findings.

6.6. Discussion and implications

Quantitative scores and qualitative findings are mostly congruent. Both data sets show the diverging perceptions of singular ecosystem conditions alongside actor groups and organisations affiliation. The qualitative interview data allows for a much more detailed analysis of differences in opinions and evaluations. The ESI variable regarding the existence of an impartial organisation for entrepreneurship support scored relatively high albeit the higher heterogeneity between respondents, however, the interview data shows a finer grained and much more differentiated picture that actually leads to EES internal power distribution amongst organisations and actors becoming a critical element for future policy implications. This however means that a simple sequential mixed-methods approach to streamline and focus the empirical evidence for policy interventions requires a heterogeneity analysis of variable scores between respondents, e.g. by standard deviation as shown in tables 6.5 and 6.6. Furthermore, this empathises the need for transparent and evenly selected expert-groups for the ESI regional expert survey, since experts of the EES are quite often stakeholders within the EES as well.

In some parts, the data complement each other. Demand Talent/Workforce and Physical Infrastructure conditions were mainly covered by ESI data while the interviews shed light on cut of elements, redundancies power distribution, dysfunctions and filtering. The complementarity of data sets especially helps to uncover regional heterogeneity of the EES and the actor relations, which are not pictured in quantitative EES data. A major insight can be added by a qualitative approach where subjective disposition leads to differing evaluations (i.e. explaining high standard deviations in the ESI expert survey variables) the qualitative interviews help to untangle these - mostly organisation bound - differences regarding single ecosystem conditions.

The triangulation design solves many problems: reliability check for quantitative data, the why to the how much, but most importantly it results in an added value, as the quantitative approach with ESI, which is already quite extensive, cannot capture specific regional peculiarities as it is designed to fit regions worldwide. The qualitative data helps to increase the fit with the region and fill the ESI gaps that are country and region bound. “Stakeholder consultation” helps to understand the EES (Autio and Levie 2017). Furthermore, this papers results show that a sequential design would help to streamline a policy finding approach for any given EES. While discovering the main areas which lag behind through quantitative data, the follow up through a focused qualitative approach on the specific EES weak points helps to shape precise policy instruments.

Shortcomings include that some areas of interest have suffered from under-coverage. The Media condition lacks interviews, only two politicians have been interviewed, not all interviews have audio recordings, mostly due to lack of permission and finally there is a small overlap between the ESI RES respondents and the interviewees. The major criticism of the applied methodology might be regarding capturing the high dynamics of an EES. Dynamics in the past are contained in the interview data, however, the actor composition, the active start-ups and the quality and quantity of organisation’s involvement changes. The state of the EES as described in this paper is that of mid-2018 to mid-2019.

Parts of the applied methodology rely heavily on GEM data and data collection methods. Although GEM data overall is high in quality and reliability there are some potential shortcomings and biases. Firstly, GEM data is perception data thus depicting the perceptions of (individually biased) stakeholders. While this is valuable insight, it bares risk of being vulnerable towards (hidden) agendas or biases such as self-serving or confirmation bias of the

surveyed individuals thus delivering a distorted image of the EES. One way this is countered is by including stakeholders of “opposing” institutions. Method wise the GEM sample consists of fixed-line and mobile phone interviews randomly selected to achieve representativity towards the general population. However, there is still need for correction using weights. Individuals without phones as well as informal sector entrepreneurship are likely not being covered by GEM data. Furthermore, the ESI as a tool to gather regional EES data lacks the ability to capture the dynamic of EES if it is only applied once. As a monitoring tool, applied annually or every other year, it would also show dynamic variations, albeit with high costs of data collection.

Implications

The RoH EES has strengths and weaknesses, leaving much room for development. The following section will prompt a few possible starting points for improving the system. While the policy implications are directly linked to the EES of the RoH, the findings can be reapplied for other EES as well if they share similar shortcomings. Overall, a re-design of services offered by the regional EDA might yield the highest impact. The EES needs room to develop from the bottom up to become sustainable and less dependent on public feed. The regional EDA needs to improve their target group coverage and continued and broadly available support stays necessary while start-up efforts get filtered into promising business models and high-risk low-reward projects that get fed back into the labour market. Also, the regional EDA is currently trying to lead in both EES sub segments (S and E), which is an extremely challenging task, especially when wearing the heavy corset of federal, national and EU administrative laws, rules and regulations. The EDA is criticized for both, being too heavily focused on start-ups and simultaneously for being only good for the standard every-day business foundations. To connect both worlds of entrepreneurship it does need a translator, as they speak different languages and, when attributed towards behaviour and ruleset, live in different times with a mismatch in culture. With EDAs being public or quasi-public organisations, the regulations state that the agencies should focus their efforts on market failures rather than compete with the services supplied by private companies and organisations.

Overall, the EES but especially the EDA needs to increase the support for growth level stages of new businesses. New thriving companies leaving the RoH due to the lack of support for their level and lack of other businesses at their stage to exchange with, is a serious issue for the EES. This requires both increased effort to keep growing new businesses within the region, creating

event formats to cater the needs of this clientele as well as strengthen the supply of growth stage funding possibilities by establishing investor connections and venture or equity capital access.

Another task would be the integration of cut of elements and reduction of system fragmentation as described in this paper by fostering inter-institutional exchange and coordination. The EDA needs to be moderating instead of governing. Furthermore, the EDA needs a drastic reduction in bureaucracy and size to actually become a viable entrepreneurship supporting institution. While the EDA aims to support dynamic business founders with high ambition and “getting-it-done” mentality, it acts stolidly like an administration creating a serious behaviour mismatch between itself and the target group. As one interviewee put it eloquently, it requires a speedboat to foster start-ups, not a freighter.

A transparent supervision and evaluation needs to be implemented to avoid further wastage of tax money for ineffective instruments, marketing budget and competition with private businesses. Overall, the EDA should be more offensive with communicating statistics, funding allocation and results. Programs such as commercials in other regions to attract entrepreneurs require serious evaluation to be a justified spending of funds.

Alongside improvements of the regional EDA, other stakeholders (actors and organisations) should form a medium of constant exchange. Some sort of round table to keep track of development within the system and sharing both knowledge and solutions creating more sense of community.

Regional politics should take a much more visible stand regarding entrepreneurship. Stakeholder relevant policies have to be implemented. To do so, dialogue with stakeholders needs to be established to increase the fit of policies with the actual need from the bottom up rather than top down from a theoretical drawing board. Furthermore, incentives for established companies should be implemented to feed or invest into the EES. By recognizing start-ups as the “new” service providers, both established and new firms could benefit from collaboration.

To foster region endogenous growth through innovative start-ups, spin-offs from higher education institutions should receive much more attention, support and funding. One possibility might be gaining sovereignty over intellectual property through offering equity to the universities. Taking a closer look at the start-up stages, growth stage support lacks throughout financing, networking, coaching or mentoring. To keep future role models within the region, this issue has to be addressed as well. However, these need specific instructions for applicable

instruments that will be the topic of future research.

Finally, entrepreneurship needs to be more focused by media. Transporting success stories and possibilities to access start-up services and education would help to increase the acceptance of self-employment as real alternative to being employed by someone else, thus creating more success stories and a more positive image of entrepreneurship. A positively directed cumulative circle causality would emerge to strengthen new firm formation and entrepreneurship acceptance sustainably.

6.7. Conclusion

The label entrepreneurial ecosystem is widely applied in the field of practice, often without a solid foundation (Mason and Brown 2017). EES-approaches as used by public organisations such as economic development agencies (EDA) or administrations are not necessarily creating efficient and effective systems with a self-sustainable critical mass of engaged stakeholders. Instead, leading positions in regional EES can be exploited as a basis to manifest power asymmetries. As entrepreneurial activity is a corner stone of regional development (see e.g. Fritsch and Mueller 2004 or Van Praag and Versloot 2007), the processes which facilitate or hinder the regional entrepreneurship should be streamlined and optimized towards a conducive environment. Applicable, empirically-based policies may contribute towards a more productive region in the long run. The goal of this paper is constructing a basis on which reliable policy implications could be created, by testing a methodological approach using two data sets: GEM ESI and EES stakeholder interviews. A specific focus was put on the sub-national spatial scale. Not only because the regional scale suffers considerable empirical gaps but also since the underlying processes of EES are most depending on (spatial) proximity of the actors. A point that is also supported by the EES stakeholder interview findings, which unearthed a distinctive regional inter-actor dynamic that only builds with frequent exposure.

The ESI has proven to be a valuable tool for analysing a regional EES as it creates high quality comparable data that allows for ranking condition qualities against each other. Other regions should be encouraged to apply GEMs ESI to further increase the potential for inter-regional comparison of regional EES. The fit with a particular region can be vastly improved by supplementing the ESI with qualitative data sourced from stakeholder interviews. The data allowed not only for a deep analysis of EES functionality, dysfunction, cut-off elements, power

distribution and the overall ecosystem condition set up, but also acted as control for the quantitative data, attesting it high reliability and plausibility.

One specific focus of this paper was on regional EDA as a main public instrument and organisation to foster regional entrepreneurial activity. Overambitious EDA activity however, seems to be acting as a negative impact on EES bottom up development and the ability to become self-sustained. Major EES internal development barriers that need to be addressed by policies are competition by public organisations and the constant need of self-legitimation as these factors are dangerous antagonists to efficient and effective ecosystem functionality. Going forward, policy implications need to be rooted in profound empirics to augment systems especially in those EES where public actors instead of entrepreneurs seem to have a leading role.

7 Thesis Conclusion

7.1 Thesis Summary

This thesis aims to contribute to phenomenon based measurement methodology for entrepreneurship with a strong spatial component. It addresses multiple research gaps both methodological and thematic and contributes strategies how (data based) research gaps on specific entrepreneurial phenomena can be closed. The thesis shows, that, while there is a need to break open new approaches for entrepreneurship research like Big Data, the traditional survey design of data collection is not out of date as long as it is used creatively and specifically tailored to the task.

This thesis adds to a more complete empirical data body, explores new measurements and expands the understanding of two research areas: Transnational Diaspora Entrepreneurship and the entrepreneurial ecosystem approach. While scientific research often puts emphasis on understanding in itself, applicability of research played a major role for this thesis. In four out of all five papers, respectively two can be seen as sequential were the first paper shows the construction of the methodology which was then applied in the following chapter. The TDE methodology is developed in chapter three and applied in chapter four. The EES measure is constructed in chapter five and used in chapter six.

The first chapter answers the question of relevance, aim and contribution of this thesis, as revisited above. Entrepreneurship and space are intertwined in an interdependent relationship. Measuring the various entrepreneurial phenomena is a key element to understanding not only that single phenomenon but to advance entrepreneurship research at large. Chapter one shows that the research field of entrepreneurship and economic geography are closely linked and the interactions of entrepreneurial activity and the space in which they occur should not be analysed separately. The fact that entrepreneurial activity can play an important role in regional endogenous growth cannot be denied. The ways in which this occurs, to which extent which effects are induced and which forms of entrepreneurial activity is the right kind to progress an individual region is by no means a trivial question. To answer complex questions, data is needed. After an overview of effects of entrepreneurial activity on spatial conditions and vice versa, some challenges of measuring entrepreneurship have been shown.

Endogeneity through interdependence has to be taken into account, a multitude of influencing factors has to be controlled for if regression calculations are computed. Entrepreneurship is a

process, thus different stages have to be addressed when collecting the data. The GEM differentiates between different kinds of entrepreneurs based on the stage in their founding process. Nascent entrepreneurs have not yet founded a business but are actively pursuing a starting effort. Early-stage entrepreneurs have either baby or young businesses up to 42 month of business age. Established owner managers own and manage businesses older than 42 month. Being able to divide entrepreneurs into these stages is most valuable in research as it opens up the possibility to pursue many additional research questions and hypotheses.

Furthermore, entrepreneurship is a very dynamic or even volatile research field. This is due to a fluctuation of business population in any region through business foundations, growth, death, migration and internationalization. Entrepreneurs themselves are a highly heterogeneous and in some cases very mobile target group. Hence, data collection is quite complicated or expensive and often a methodology is only able to take snapshots rather than a „finished picture“ of a specific region’s entrepreneurial activity. High dynamics in firm population also lead to variation of effects, as those are dependent on the type of entrepreneurship and not only the amount.

After pointing out the relevance of the thesis, the used data is briefly introduced and the thesis structure is explained as well as the role of each paper in it. A short summary of each chapter follows, after a recap of the GEM introduction while the combined outcome and synergy of the chapters are addressed in chapter 7.2. Due to its significance for this work, the Global Entrepreneurship Monitor receives a special introduction as GEM data or methodology is used in every paper-based chapter of this thesis.

Following this first introductory chapter, the second chapter “*New(s) data for Entrepreneurship Research?*” explores the usability of media data for quantitative entrepreneurship research. The data set used can be classified as Big Data and can be analysed for sentiment. The interdependence of media and entrepreneurial activity, especially in a spatial context, is found to be quite complex. The chapter delivers an overview on methodology of measuring entrepreneurship as well as covering the relationship between it and its coverage in public media or “news”.

Most (quantitative) empirical research in entrepreneurship is based on data sources like registers and surveys. This chapter aims to open up a new line of insight through big data. It is

emphasised, that the exploration of new approaches should be seen as an addition to the toolbox rather than a radical change and replacement. Presumably, both traditional survey data and Big Data approaches will augment and complement each other. While register data also might serve a purpose it is somewhat excluded from this as it suffers major shortcomings in data cleanliness, quality and explanatory power.

Contentwise, the chapter cannot show a clear impact of regional entrepreneurial activity on regional entrepreneurial news reporting. Firstly, these findings progress the knowledge base on this specific research questions. Secondly, these results show the necessity of taking different paths as well as refining, updating and developing methodological approaches.

The current data basis of research has to be modernised stepwise, by implementing data from recent, fast-paced sources.

The third chapter “*Transnational Diaspora Entrepreneurship: A rare event measureable with new GEM data*”, turns towards more traditional approaches of data collection. The explained survey design is embedded into the conceptual framework of the Global Entrepreneurship Monitor. The research project DiasporaLink (to be more precise the working package of developing a method for measuring, monitoring and evaluating TDE) had a perfect fit with the international research consortium. One part of the method described in this paper, the quantitative survey design for GEM APS and NES, was applied in various GEM countries. It has, however, some weaknesses, which are stated in chapter three and will be revisited in chapter 7.2.

Turning not only to a new methodological approach but also a new area of research within entrepreneurship, the theoretic foundation of the transnational entrepreneurship and diaspora entrepreneurship had to be introduced. Closely connected to rising volumes of migration paired with cheapening global communication and travel cost, a highly mobile class of transnational migrant entrepreneurs slid into the focus of research. A set of newly developed questions embedded into GEMs adult population and national expert surveys was used, allowing for isolating very specific target groups of transnational, diaspora, remigrant entrepreneurs as well as any combination. However, if a country has a low absolute number of entrepreneurs, this detailed division into subsets remains a theoretical possibility.

Despite transnational diaspora entrepreneurship being an extremely rare event, the developed methodology was able to produce plausible data as the next chapter shows.

The fourth chapter “*Transnational entrepreneurs: Opportunity or necessity driven?*” uses data collected with the questionnaire from chapter three in the 2016 and 2017 GEM cycle of Chile and Germany and yet being able to compare TE data reliably between the two countries. The chapter covers two specific application of that data alongside the country comparison the questions of start-up motivation by transnational entrepreneurs is focused. After a short recapture of TDE, TE and start-up motivation literature, the national contexts are described, followed by the data analysis. The chapter finds differences in the configuration of the national entrepreneurial ecosystems and the share of transnational entrepreneurs compared to all entrepreneurs. Germany has a higher percentage of transnationals than Chile yet less transnational entrepreneurs per capita due to the high absolute number of entrepreneurs in Chile. The data indicates transnational entrepreneurs are more prone to embody traits such as higher opportunity recognition, knowing more entrepreneurs, decreased fear of failure and having a higher degree of self-efficacy than non-transnationals.

The chapter is also setting up the next one by bridging into the ecosystem topic. Although the research questions differ a lot, many forms and manifestations of entrepreneurship share interdependencies through the complexity of the field as described earlier. One example are migrant entrepreneurs and their ability to connect ecosystems. The latter is the subject of the two chapters summarised next.

“*Measuring entrepreneurial ecosystems at regional level*” is the fifth chapter and functions as an introductory to the entrepreneurial ecosystem subject. The chapter contributes an approach to the EES debate by providing a methodology for robust empirical measurements of various EES at the sub-national spatial scale thus improving the quality of EES theory and empirics. The chapter is rooted in Stam’s (2015) interpretation of an EES based upon ten “conditions”. It proposes an index built from combining survey data to be conducted with a GEM embedded questionnaire that has been tailored to EES needs on a regional scale. The chapter provides an extensive overview on EES literature and reveals a severe lack of empirical evidence regarding several basic assumptions of the EES.

The chapter displays the translation of a theoretic model into an applicable methodology leading to reliable and valid data. Data that was conducted later on in a pilot study in two Spanish and one German region. The data and index values from the latter region are elements of the next and last chapter based on a paper.

The final chapter before the conclusion, “*The Road to Evidence based applicable Policies for regional Entrepreneurial Ecosystems*” builds on experience and findings of the previous chapters. It contains an application of the conceptualized method for capturing EES data and supplements it with interview data. The goal is to build an empirical basis on which policies can be build. As example region, the Region of Hanover is used. However, this chapter should not be understood as a regional case study. The RoH was used to demonstrate a methodological approach to gain in depth EES knowledge with the aim to procure policy implications to further develop a regional EES. Standard GEM data is used to gain insight into the characteristics of the regions entrepreneurial activity and its development by reviewing GEM Data for the RoH of 2012 and 2018. In the next step, the ESI results are displayed, followed by a strong focus on qualitative interview data.

The chapter shows that the ESI methodology can be functionally applied to the field yielding high quality results, which then can be supplemented or refined, e.g. by reducing ESI variable level or target group separation. The results of the chapter lead to in depth understanding of the different layers, composition and systemic functions of a regional entrepreneurial ecosystem. Furthermore, ESI and qualitative interviews could be embedded into a sequential mixed methods approach to cost-effectively analyse the weak points as basis to develop special tailored policies.

7.2 Not just a Sum of its Parts

Loosely following Schätzl (e.g. 1994), fostering entrepreneurship effectively and based on profound research can be achieved by progressing through the trinity of theory – empirics and policy. This thesis lays its focus and emphasis on the middle part, as it is often neglected. Entrepreneurial ecosystems suffered the same illness as the creative class (Florida 2002) or clusters (Porter 2000). Not only do researchers bustlingly leap for new concepts to inflate the theoretic literature but especially policy makers, in hope for a saviour of their regions economy, adapt such concepts before any sophisticated evaluation and validation of theorized causalities have been tested and proven. In this respect - what is the achieved learning from the combined outcome of the papers used for this thesis?

Each paper used in this thesis contributes to better understanding of measuring entrepreneurship. Chapter two not only lays the ground work in reviewing methodology but questions traditional approaches by introducing a new data source and method for entrepreneurship research. Chapter three displays the conceptual framework to target a specific entrepreneurial phenomenon with a difficult target group. The fourth chapter exhibits the application of data collected with the methodology from chapter three. It also adds the dimension of comparability based on a unified survey design and data collection process. While chapter four differentiates between „standard“ entrepreneurs and transnational entrepreneurs as well as respective start-up motives for two countries, the fifth chapter then faces the challenging task of building a methodology aimed at capturing context influence as well as context interaction, contributing to progressing the systemic view of (regional) entrepreneurial activity: Entrepreneurial Ecosystem. This paper is built from two substantial reports constructing an Index approach for entrepreneurial ecosystems with GEM data (von Bloh, Coduras and Sternberg 2018 and Sternberg, von Bloh and Coduras 2018), that have been issued by the Global Entrepreneurship Research Association (GERA). Therefore, it is meant for application and usage in the field, thus bringing a lot more to the table than a mere academic exercise. It is meant to create impact by helping practitioners analysing their respective EES to specifically target areas to improve. The sixth chapter shows not only such an application of the data collected with the conceptualized methodology from chapter five but also supplements it with qualitative data from stakeholder interviews, thus enriching the data set even more.

After setting the scene and exploring new ways of capturing data on entrepreneurship, the usage of „classic“ survey designs is displayed. The complexity and requirements progresses from

chapter three to six, building on the experience made in the previous one. While this succession might be not as bland in terms of topics, it has been experienced by the author in sequence. Starting with a conceptualization of a methodology to measure TDE, refining and applying it in data collection, embedded in an international approach was followed by the task to develop an EES index with GEM data. The first step in this was a feasibility study based on existing GEM data and special topics that led to a new set of questions rooted in theory. Another international application of the survey design followed by means of piloting its data collection followed by the index calculation for three European regions. The data from this pilot was used in the final research on the Region of Hanover. All these steps build upon each other, resulting in the thesis at hand.

As mentioned, every paper-based chapter uses GEM data in one way or another. The data serves at least three different ways: As explanatory variables, as tool to compare countries in various aspects and as supplementation of an in depth search for system weaknesses. The multiple purposes and ways of implementation into the research designs show the high value and versatility of GEM data in particular and high quality survey data in general. While there is a need to break open new approaches for data on entrepreneurship to explain newly risen phenomena, there is still a fundamental need for survey-based data with a design that can be adapted to different spatial scales as well as vastly diverse target groups, stages and research questions. The GEM still is amongst the most valuable sources for this kind of data on entrepreneurship. The thesis shows that the traditional survey design of data collection is by no means obsolete. While there is a need to explore new methods to expand the borders of entrepreneurship research there is still much to be researched within those borders. Central learnings might be that indeed no size fits all (a reference to a paper title Toedtling and Trippel 2005). As colourful as the real world occurrence of entrepreneurship is, as colourful the methods have to be. Topics, target groups, individual regions and or overall context demand special tailored approaches and tools. The entrepreneurial phenomena evolve as the world progresses. The methods have to do the same.

A major critique for existing empirical approaches is too much proximity to theoretic house of cards and too much distance to the real world. Explorative and fundamental research should be but a starting point and not the end of the road. The final chapters of this thesis try to bridge into real world applicability. While scientific research often has a heavy emphasis on theory, the point of view from practitioners is often neglected. If there was one learning to take away from this thesis it would be the necessity to include actual stakeholders into any meaningful

assessment. This thesis holds a plea for less theorizing, less milking of old datasets, more problem specific approaches, mixing data sources and combining qualitative and quantitative data.

Reflection

As every research, this thesis brings along some flaws. First, all data gathered is also only a snapshot. Entrepreneurial processes in a regional context are dynamic. To capture empirical data for such regions, monitoring and reoccurring data collection is necessary to depict this dynamic nature. Fortunately this thesis developed methods to monitor at least two entrepreneurial phenomena: T(D)E and regional EES. The TDE data suffers from some challenges due to the very rare target group. TDE and TE is a small subset of entrepreneurial activity. Thus, countries or regions with low absolute numbers might end up with a problematically small sample size of TDE. Furthermore, the planned follow up on the TDE related organisations and associations did never happen since the project developed into another direction. This deprives the data set of a validity check, which could lower trust into the data. Negative results (e.g. not being able to show significant causalities) are results in itself. It hints at the absence of dependence between variables and allows drawing at least two valuable conclusions: Either the method needs to be rethought (or refined) or the causal relation is not existent as stated in the hypothesis.

This thesis is built upon five core chapters of entrepreneurship research spanning three different topics unified by the common theme of measuring entrepreneurial phenomena in a spatial context. Whether it is for comparison, for in depth understanding or to find the right angle to push a regions endogenous potential for growth, the right kind of data is needed. Quality of data can influence, bias and predetermine the outcome of any research. Garbage in – garbage out. There is much room and need for further empirical research on entrepreneurship – data set creation of specific types of entrepreneurship is a necessary step towards progressing the understanding of entrepreneurial processes and their interaction with space. Entrepreneurship has a tremendous amount of influence on our world, therefore we should strive to fully understand all aspects and forms of it to mould and shape it to our advantage. This requires constantly evaluating whether the status of research holds up to the newest findings, developments, context changes or methodological progress and adjusting it if a state of lacking behind is diagnosed. Lastly, entrepreneurship is un-unravably intertwined with the space in which it occurs and it should be treated as such.

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Appendix

Appendix A: Python script

```
from urllib.request import urlopen
from time import sleep
import time
time.strftime("%Y-%m-%d %H:%M")

api_key = "" #key will not be displayed in the appendix!
URL = "http://api.presseportal.de/api/article/all?api_key=[...]&format=xml"

# define limit
limit = '50'

def scraper():
    aa = "n"
    begin = 0
    ending = ""
    scrp_upto = input("Choose amount of entries to scrape:\n\nFull set 0-1000:\t(1)\n"
                     "Just yesterday:\t(2)\nChoose ending:\t(3)\nQuit\t(9)\n\nEnter choice: ")
    if scrp_upto == "1":
        ending = 1000
    elif scrp_upto == "2":
        ending = 350
        print("review xml files for possible gaps!")
    elif scrp_upto == "3":
        while ending not in range(1001):
            ending = input("\n\nChoose ending entry: ")
            try: ending = int(ending)
            except ValueError:
                ending = -1
    elif scrp_upto == "9":
        print("bye...")
        sleep(2)
        exit()
    else:
        return False
    start_counter = begin
    mergestring = ""
    print("\nstart scraping from entry " + str(begin) + ". . .")
    sleep(1)
    while start_counter < ending + 1:
        start = str(start_counter)
        timestamp = str(time.strftime("%Y-%m-%d_%H-%M-%S"))
        filename = timestamp + mergestring + start
        requestURL = URL + '&limit=' + limit + '&start=' + start # merges URL from dynamic inputs
        s = urlopen(requestURL)
        contents = s.read()
        file = open("%s.xml" % str(filename), "wb")
```

```
file.write(contents) # saves xml within working directory of scraper
print(start)
start_counter += 50
sleep(0.5)
print("...done")
while aa != "e" and aa != "r":
    aa = input("end program (e) or restart? (r) \n")
if aa == "e":
    return False
else:
    return True

while True:
    if not scraper():
        break
exit()
```

Appendix B.1: GEM TDE: Excerpt of GEM APS questionnaire 2016

TDE1	TDENATIVE	Were you born in [country of survey]?	Yes		1	ASK TDE2
			No		2	SKIP TO TDE3
			Don't Know		-1	SKIP TO TDE4
			Refused		-2	SKIP TO TDE4
TDE2	TDERM	Have you lived in another country for several years and still have business related connections with that country?	Yes		1	ASK TDE2A
			No		2	SKIP TO TDE4
			Don't Know		-1	SKIP TO TDE4
			Refused		-2	SKIP TO TDE4
TDE2A	TDERMO	Are you a member or beneficiary of a organization in this country [country of survey] with links to the country you have lived in?	Yes		1	ASK TDE2B
			No		2	SKIP TO TDE4
			Don't Know		-1	SKIP TO TDE4
			Refused		-2	SKIP TO TDE4
TDE2B	TDERMO ID	Could you tell me the name of the organization?				
			Don't Know		-1	
			Refused		-2	
ASK QUESTIONS ONLY IF RESPONDENT ANSWERED "NO" (2) TO TDE1, OTHERWISE SKIP TO TDE4						
TDE3	TDECOO	In what country were you born?				
			Don't Know		-1	
			Refused		-2	
TDE3A	TDEM	Do you have business related connections with your country of origin?	Yes		1	ASK TDE3B
			No		2	SKIP TO TDE3D
			Don't Know		-1	SKIP TO TDE3D
			Refused		-2	SKIP TO TDE3D
TDE3B	TDEMO	Are you a member or beneficiary of a organization in this country [country of survey] with links to your country of origin?	Yes		1	ASK TDE3C
			No		2	SKIP TO TDE3D
			Don't Know		-1	SKIP TO TDE3D
			Refused		-2	SKIP TO TDE3D
TDE3C	TDEMO ID	Could you tell me the name of the organization?				
			Don't Know		-1	
			Refused		-2	
TDE3D	TDEDIAS	Are you actively in contact for business related purposes with people from your country of origin who also live in [country of survey]?	Yes		1	
			No		2	
			Don't Know		-1	
			Refused		-2	
TDE4	TDE2MQ	Were either of your parents born outside of [country of survey]?	Yes		1	ASK TDE4A
			No		2	SKIP TO BLOCK 7
			Don't Know		-1	SKIP TO BLOCK 7
			Refused		-2	SKIP TO BLOCK 7
TDE4A	TDE2M	Do any of your business operations benefit from contacts in your parent's country of birth, that you have just told me was not (country of survey)?	Yes		1	
			No		2	
			Don't Know		-1	
			Refused		-2	

Appendix B.2: GEM TDE: Excerpt of GEM NES questionnaire 2016

In my country...

TE1	... migrants play an important role in the economy.
TE2	... there are organizations that successfully keep in touch with people of [country of survey] who live in other countries.
TE3	... bilateral transnational business connections are important for the economic growth potential of [this country].
TE4	... in-migration and remigration (back to [country of survey]) are perceived as economically positive.
TE5	... rules and regulations for starting a business do not discriminate foreign-born entrepreneurs compared with those born in Germany.
TE6	... it is easy to get access to funding as a foreign-born entrepreneur.
TE7	... the government actively encourages [people from this country, who live abroad,] to return to [country of survey].
TE8	... the government is actively supports entrepreneurship among [e.g. people from country of survey] returning migrants.

Appendix C: Variable Description

Variable	Description
Transnational	1 = respondent is migrant or re-migrant and early stage or established entrepreneur, binary
Tertiary Education	1 = respondent has tertiary education or higher, binary
Female	Dummy variable covering whether a respondent is female, binary
Age	The age of the respondent, ranging from 18 to 64
Knows an Entrepreneur	1 = respondents know someone how has started a business within the last 2 years, binary
Opportunity Recognition	1 = respondents see good opportunities for starting a business within the next 6 month, binary
Self-Efficacy	1 = respondents say they believe that they have the necessary skills to start a business or not, binary
Fear of Failure	1 = respondents would abstain from pursuing a business foundation due to the fear of failure, binary
Germany	Dummy variable for respondents in the German sample, binary
Opportunity driven entrepreneur (OPP)	1 = respondent is an early stage or established entrepreneur with an opportunity based motive for the business foundation, binary
Necessity driven entrepreneur (NEC)	1 = respondent is an early stage or established entrepreneur with a necessity based motive for the business foundation, binary

Appendix D.1: GEM ESI: GEM EES APS Questionnaire

ENTREPRENEURIAL ECOSYSTEM MODULE STARTUPS									
Please select the most appropriate response. You can answer very rarely, rarely, occasionally, frequently or very frequently. (ENTER SINGLE RESPONSE)									
			Very rarely	Rarely	Occasionally	Frequently	Very frequently	Don't Know	Refused
SUEES1	EESU_NET1	How often do you attend local business networking events?	1	2	3	4	5	-1	-2
SUEES2	EESU__ADREC	How often do you receive advice for your new business in form of mentoring from established business founders in your region?	1	2	3	4	5	-1	-2
SUEES3	EESU__ADGIV	How often do you give advice in form of mentoring to new business owner-managers?	1	2	3	4	5	-1	-2
Please tell me the extent to which you agree with the following statements. You can strongly disagree, somewhat disagree, neither disagree, nor agree, somewhat agree or strongly agree. (ENTER SINGLE RESPONSE)									
			Strongly disagree	Somewhat disagree	Neither disagree, nor agree	Somewhat agree	Strongly agree	Don't Know	Refused
SUEES4	EESU__INSP	Your decision to start your own business was strongly inspired by a start-up or business from your region.	1	2	3	4	5	-1	-2
SUEES5	EESU__LEARN	Your business is built on the result of something you learned from a person or organization in your region.	1	2	3	4	5	-1	-2
SUEES6	EESU__SUP1	Your new business is strongly supported by a program in your region which is aimed at business start-ups (e.g. an accelerator or incubator program).	1	2	3	4	5	-1	-2
SUEES7	EESU__ACCESS	In [REGION], it is easy to get in touch with other owner-managers of young businesses personally.	1	2	3	4	5	-1	-2
SUEES8	EESU__HELP	If you need any advice or help regarding your business, you can easily find the right people through your network.	1	2	3	4	5	-1	-2
SUEES9	EESU__NET2	Most business owner-managers in the same industry and region as you actively participate in at least one local business network.	1	2	3	4	5	-1	-2
SUEES10	EESU__EXTFUND	You feel there are adequate sources of external start-up funding in your region.	1	2	3	4	5	-1	-2
SUEES11	EESU__SHORT	There is a shortage of the types of employees you need for your business in your region.	1	2	3	4	5	-1	-2
SUEES12	EESU__AFFHIRE	You can afford to hire the employees you need for your business locally.	1	2	3	4	5	-1	-2

SUEES13	EESU__SKILLS	You are satisfied that the skill levels of people in [REGION] are sufficient for your business needs.	1	2	3	4	5	-1	-2
SUEES14	EESU__TRAIN	There are in general, enough workshops and other training opportunities accessible within [REGION] to learn the business skills you need for your business.	1	2	3	4	5	-1	-2
SUEES15	EESU__BUREAUC	Bureaucracy and regulations you encounter during the founding of your business are a serious problem.	1	2	3	4	5	-1	-2
SUEES16	EESU__SUP2	Most people in [REGION] are supportive of individuals who are interested in becoming entrepreneurs.	1	2	3	4	5	-1	-2
Please tell me how satisfied you are with the following elements of physical infrastructure in [REGION] in relation to your business needs. You can be completely unsatisfied, somewhat unsatisfied, neither unsatisfied, nor satisfied, somewhat satisfied or completely satisfied. (ENTER SINGLE RESPONSE)									
			Completely unsatisfied	Somewhat unsatisfied	Neither unsatisfied, nor satisfied	Somewhat satisfied	Completely satisfied	Don't Know	Refused
SUEES17	EESU__INFRA	Transport infrastructure (for example, roads parking space, traffic flow)	1	2	3	4	5	-1	-2
SUEES18	EESU__TELE	Telecommunications, internet access and speed	1	2	3	4	5	-1	-2
SUEES19	EESU__SPACE	Price and availability of additional physical space to grow your business	1	2	3	4	5	-1	-2

ENTREPRENEURIAL ECOSYSTEM MODULE OWNER MANAGER									
Please select the most appropriate response. You can answer very rarely, rarely, occasionally, frequently or very frequently. (ENTER SINGLE RESPONSE)									
			Very rarely	Rarely	Occasionally	Frequently	Very frequently	Don't Know	Refused
OMEES1	ESSOM__NET1	How often do you attend local business networking events?	1	2	3	4	5	-1	-2
OMEES2	ESSOM__ADREC	How often did you receive advice for your new business in form of mentoring from established business founders in your region?	1	2	3	4	5	-1	-2
OMEES3	ESSOM__ADGIV	How often do you give advice in form of mentoring to new business owner-managers?	1	2	3	4	5	-1	-2
Please tell me the extent to which you agree with the following statements. You can strongly disagree, somewhat disagree, neither disagree, nor agree, somewhat agree or strongly agree. (ENTER SINGLE RESPONSE)									

			Strongly disagree	Somewhat disagree	Neither disagree, nor agree	Somewhat agree	Strongly agree	Don't Know	Refused
OMEES4	ESSOM__INSP	Your decision to start your own business was strongly inspired by a start-up or business from your region.	1	2	3	4	5	-1	-2
OMEES5	ESSOM__LEARN	Your business was built on the result of something you learned from a person or organization in your region.	1	2	3	4	5	-1	-2
OMEES6	ESSOM__SUP1	Your new business is strongly supported by a program in your region which is aimed at business start-ups (e.g. an accelerator or incubator program).	1	2	3	4	5	-1	-2
OMEES7	ESSOM__ACCESS	In [REGION], it is easy to get in touch with other owner-managers of young businesses personally.	1	2	3	4	5	-1	-2
OMEES8	ESSOM__HELP	If you need any advice or help regarding your business, you can easily find the right people through your network.	1	2	3	4	5	-1	-2
OMEES9	ESSOM__NET2	Most business owner-managers in the same industry and region as you actively participate in at least one local business network.	1	2	3	4	5	-1	-2
OMEES10	ESSOM__EXTFUND	You feel there are adequate sources of external start-up funding in your region.	1	2	3	4	5	-1	-2
OMEES11	ESSOM__SHORT	There is shortage of the types of employees you need for your business in your region.	1	2	3	4	5	-1	-2
OMEES12	ESSOM__AFFHIRE	You can afford to hire the employees you need for your business locally.	1	2	3	4	5	-1	-2
OMEES13	ESSOM__SKILLS	You are satisfied that the skill levels in [REGION] are sufficient for your business needs.	1	2	3	4	5	-1	-2
OMEES14	ESSOM__TRAIN	There are in general, enough workshops and other training opportunities accessible within [REGION] to learn the business skills you need for your business.	1	2	3	4	5	-1	-2
OMEES15	ESSOM__BUREAUC	Bureacracy and regulations you encounter during the founding of your business are a serious problem.	1	2	3	4	5	-1	-2
OMEES16	ESSOM__SUP2	Most people in [REGION] are supportive of individuals who are interested in becoming entrepreneurs.	1	2	3	4	5	-1	-2

Please tell me how satisfied you are with the following elements of physical infrastructure in [REGION] in relation to your business needs. You can be completely unsatisfied, somewhat unsatisfied, neither unsatisfied, nor satisfied, somewhat satisfied or completely satisfied. **(ENTER SINGLE RESPONSE)**

			Completely unsatisfied	Somewhat unsatisfied	Neither unsatisfied, nor satisfied	Somewhat satisfied	Completely satisfied	Don't Know	Refused
OMEES17	ESSOM__INFRA	Transport infrastructure (for example, roads parking space, traffic flow)	1	2	3	4	5	-1	-2
OMEES18	ESSOM__TELE	Telecommunications, internet access and speed	1	2	3	4	5	-1	-2
OMEES19	ESSOM__SPACE	Price and availability of additional physical space to grow your business	1	2	3	4	5	-1	-2

Appendix D.2: GEM ESI: GEM EES RES Questionnaire

Cited from the Regional Entrepreneurial Ecosystem Expert Survey Questionnaire document by GEM (2018):

The following statements assess regional conditions influencing entrepreneurial activity in region XY. 1 = completely false (CF) to 9 = completely true (CT); or choose 97 = don't know (DK) or 98 = not applicable (NA).

Topic NEE: Networks In region XY...	
NEE06	Public organizations run start-up events with sufficient frequency to support new and growing businesses effectively (n6)
NEE07	Private organizations or members of the start-up community run start-up events with sufficient frequency to support new and growing businesses effectively (n7)
NEE08	There are visible examples of a well-connected community of start-ups and entrepreneurs with active investors, advisors, mentors, media and supporters. Examples might include co-hosted events, joint operations, or cooperation across stakeholder groups (n8)
NEE09	start-up community networks are well known and accessible (n9)
NEE010	different local organizations often jointly organize events to foster regional entrepreneurial activity (n10)

Topic LEE: Leadership In region XY...	
LEE04	at least one strong entrepreneurial group or individual with high economic impact is a visible part of an entrepreneurial community (l4)
LEE05	there is a broad pool of well-respected mentors and advisors offering support for new and growing firms, acting for the long term rather than pursuing short time financial gain (l5)
LEE06	public and private organizations cooperate with each other to enhance entrepreneurship in the region (l6)
LEE08	the development of the ecosystem is constrained due to a single public or private organization or actor having too much power (l8)

Topic FEE: Finance In region XY...	
FEE04	new and growing firms have sufficient access to equity funding (f4)
FEE05	new and growing firms have sufficient access to debt funding (f5)
FEE06	new and growing firms have sufficient access to government subsidies (f6)
FEE07	new and growing firms have sufficient access to funding from business angels (f7)
FEE08	new and growing firms have sufficient access to funding from venture capitalists (f8)
FEE09	entrepreneurs have sufficient access to pre-startup funding (f9)
FEE010	entrepreneurs have sufficient access to funding for their start-up phase (f10)
FEE011	entrepreneurs have sufficient access to funding for business growth (f11)

Topic TEE: Talent In region XY...	
TEE04	a broad array of highly skilled workers is available for new and growing firms (t4)
TEE05	higher education institutions ensure the workforce for new and growing firms is sufficient in quality (t5)
TEE06	higher education institutions ensure the workforce for new and growing firms is sufficient in quantity (t6)
TEE07	highly qualified young people tend to stay within the region (t7)
TEE08	is an attractive location to move to for people with the skills needed by new and growing firms (t8)

Topic KEE: Knowledge In region XY...	
KEE03	there are many examples of new and growing firms that use new technology, science, and other knowledge developed in local universities and public research institutions (k3)
KEE05	New knowledge developed by large businesses in [REGION XY] are an important source of ideas for new and growing firms within [REGION XY] (k5)
KEE06	New knowledge about doing business flows freely between entrepreneurs in [REGION XY] (k6)

Topic SEE: Support services/intermediaries In region XY...	
SEE03	there are enough high-quality subcontractors, suppliers, and consultants to support new and growing firms (s3)
SEE04	new and growing firms can afford the cost of local subcontractors, suppliers, and consultants (s4)
SEE05	a wide range of government assistance for new and growing firms can be obtained through contact with a single agency (s5)

SEE06	an impartial agency exists as first contact point for entrepreneurs, helping them to find the optimal sources of support for their specific needs (s6)
SEE07	government programs for new and growing businesses are sufficiently tailored to regional needs (s7)
SEE08	regional agencies efficiently enable access to national and international support programs for new and growing businesses (s8)

Topic IEE: Formal institutions In region XY...	
IEE03	government policies (e.g. public procurement) consistently consider new and growing firms (i3)
IEE041	support for new and growing firms is a high priority for the local government (i4)
IEE042	support for new and growing firms is a high priority for Chambers (of Craft, of Commerce, of Industry, etc.).
IEE043	support for new and growing firms is a high priority for Educational Institutions
IEE05	it is extremely difficult for new and growing firms to cope with government bureaucracy, regulations, and licensing requirements (i5)
IEE06	almost anyone who needs help from a government program for a new or growing business can find what they need (i6)
IEE07	government programs aimed at supporting new and growing firms are significantly improving the chances of survival and success of those firms (i7)

Topic CEE: Culture In region XY...	
CEE07	large established firms are supportive of high-growth start-ups, pursuing a long-term interest or investment rather than hostile or short-term motives (takeover to shut down, dismantling, etc.) (c7)
CEE08	there are many events for start-up entrepreneurs, such as meet-ups, pitch days, start-up weekends, boot camps, hackathons and competitions (c8)
CEE09	new and growing firms can enter markets without being unfairly blocked by established firms (c9)
CEE010	most people are supportive of individuals who are interested in becoming entrepreneurs (c10)

Topic PEE: Physical Infrastructure In region XY...	
PEE03	the general physical infrastructure like roads, utilities, waste disposal provides good support for new and growing firms (p3)
PEE04	it is not too expensive for a new or growing firm to get good access to communications (phone, Internet, etc.) (p4)
PEE05	new or growing firms have access to state of the art internet connection speed (p5)
PEE06	new or growing firm have access to affordable office space (p6)

Topic DEE: Demand In region XY...	
DEE01	customers prefer, if possible, to buy goods and services which are produced by local firms (d1)
DEE02	most new and growing firms can sell their goods and services locally (d2)
DEE03	consumers are open to new and innovative products and services (d3)
DEE04	the first customers of many new firms are located in this region (d4)
DEE05	it is easy to access markets outside of the region (d5)

Appendix E: Code System Interview Data

Code tree

Empty sub-codes have been deleted, which is why some classes have only one sub-code.

1 system	7.4 hannoverimpuls
1.1 efficiency or functionality	7.5 access to supraregional gov. programs
1.2 filter	7.6 services for growth stage businesses
1.3 market failure	7.7 services for "Existenzgründungen"
1.4 collaboration or actor interconnectedness	7.8 services for start-ups
1.5 deficiencies or dysfunction	8 formal Institutions or bureaucracy
1.6 redundancies	8.1 bureaucracy
1.7 imbalances or power distribution	9 talent or workforce
1.8 cut off elements	9.1 workforce
1.9 linkage with other systems	10 Infrastructure
1.10 geographic span	10.1 physical
2 policy and policy implications	10.2 accelerators
2.1 policy an politics	11 finance
2.2 implications for action	11.1 venture capital or business angels
3 entrepreneurial activity	11.2 finance actors
3.1 development	11.3 founding phase
3.2 numbers	11.4 growth phase
4 leadership and community	11.5 dept capital or credit funding
4.1 refeed into system	11.6 subsidies
4.1.1 NO refeed	12 networks
4.1.2 YES refeed	12.1 functionality
4.2 role model existence	12.2 events - Quality
4.3 leading actors	12.3 events - Quantity
4.4 role of established firms	12.4 collaboration: public
5 culture and mindset	12.5 collaboration: private
5.1 media attention	
5.2 regional mindset on e-ship	
5.3 large firms invest in EES	
5.4 start-up community	
6 knowledge creation and diffusion	
6.1 accessibility of knowledge	
6.2 established firms: innovation activity	
6.3 HEI existence and role	
7 support services and service providers	
7.1 quality management others	
7.2 who	
7.3 provision of service	

Declaration of individual contributions to the joint publication:

von Bloh, J., Oezgun, B., Broekel, T., Sternberg, R. (2020), New(s) data for Entrepreneurship Research? An innovative approach to use Big Data on media coverage. *Small Business Economics* 55(3), 673-694. DOI: 10.1007/s11187-019-00209-x.

Between the PHD student Johannes von Bloh

and the co-author Tom Broekel

The scientific contribution¹ to the publication divides as followed:

Contribution of PHD student:

- Data collection (dpa)
- Data processing (GEM data)
- State of literature on measuring entrepreneurship as well as news
- Data and variable description
- Discussion of findings
- Conclusion
- Small parts of the introduction (together with Rolf Sternberg)


Contribution of co-author:


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- description of methodology
- R-Script (together with Burcu Oezgun)
- Data processing (dpa, together with Burcu Oezgun)

Parts created in conjunction:

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20 % contributed by co-author 2.11.2020, Stavanger 
(date / city / signature)

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Declaration of individual contributions to the joint publication:

von Bloh, J., Oezgun, B., Broekel, T., Sternberg, R. (2020), New(s) data for Entrepreneurship Research? An innovative approach to use Big Data on media coverage. *Small Business Economics* 55(3), 673-694. DOI: 10.1007/s11187-019-00209-x.

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- creation of the figure: "The relationship between media Coverage and entrepreneurial activities"

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von Bloh, J.; Mandakovic, V.; Apablaza, M.; Amorós, J.E.; Sternberg, R. (2020): Transnational entrepreneurs: opportunity or necessity driven? Empirical evidence from two dynamic economies from Latin America and Europe, *Journal of Ethnic and Migration Studies* 46(10), 2008-2026. DOI: 10.1080/1369183X.2018.1559996

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Contribution of co-author:

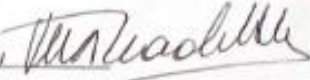
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- data analysis
- refinement

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- data analysis (together with Vesna Madakovic)
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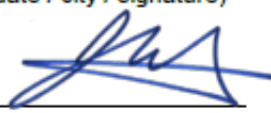
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- data analysis (together with Vesna Madakovic)
- Theoretical framework (together with J. Ernesto Amorós)
- Data analysis (together with Mauricio Apablaza and Vesna Mandakovic)


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- Chapter three: "Erik Stam's concept and operationalisation of Entrepreneurial Eco-Systems"
- Reports for GEMs RIAC building the underlying ESI concept for this paper (in conjunction with Alicia Coduras)
- Adaption of figure 1 from Stam (2015)
- A small part of the introduction and conclusion


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- Most of the conclusion
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- Chapter three: "Erik Stam's concept and operationalisation of Entrepreneurial Eco-Systems"
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- Global Entrepreneurship Monitor: Developing the Entrepreneurial Ecosystem Composite Index (ESI) (2017-2020)
- Regional Entrepreneurial Ecosystems: An explorative analysis of the Region of Hanover (2016-2019)
- DiasporaLink - Evaluation and facilitation of transnational diaspora entrepreneurship (TDE) as a driver of development and wealth creation in countries of origin and residence (2015-2019)

List of publications (as of January 2021):

- 2021 **von Bloh, J.** (2021): The Road to Evidence based applicable Policies for regional Entrepreneurial Ecosystems. *Journal of Entrepreneurship and Public Policy* 10(1): 59-77.
- 2020 **von Bloh, J.**, Oezgun, B., Broekel, T., Sternberg, R. (2020), New(s) data for Entrepreneurship Research? An innovative approach to use Big Data on media coverage. *Small Business Economics* 55(3), 673-694. DOI: 10.1007/s11187-019-00209-x.
- von Bloh, J.**, Mandakovic, V., Apablaza, M., Amorós, J.E., Sternberg, R. (2020): Transnational entrepreneurs: opportunity or necessity driven? Empirical evidence from two dynamic economies from Latin America and Europe, *Journal of Ethnic and Migration Studies*, 46:10: 2008-2026, DOI: 10.1080/1369183X.2018.1559996
- Sternberg, R., Wallisch, M., Gorynia-Pfeffer, N., Baharian, A., Stolz, L., **von Bloh, J.** (2020): Global Entrepreneurship Monitor (GEM). *Länderbericht Deutschland 2019/20*. Eschborn und Hannover; RKW Kompetenzzentrum und Institut für Wirtschafts- und Kulturgeographie, Leibniz Universität Hannover.
- 2019 Sternberg, R., **von Bloh, J.**, Coduras, A. (2019): A new framework to measure entrepreneurial ecosystems at the regional level. *Zeitschrift für Wirtschaftsgeographie (= The German Journal of Economic Geography)* 63(2-4), 103-117.
- Sternberg, R., Wallisch, M., Gorynia-Pfeffer, N., **von Bloh, J.**; Baharian, A. (2019): Global Entrepreneurship Monitor (GEM). *Länderbericht Deutschland 2018/19*. Eschborn und Hannover; RKW Kompetenzzentrum und Institut für Wirtschafts- und Kulturgeographie, Leibniz Universität Hannover.
- 2018 **von Bloh, J.**, Coduras, A., Sternberg, R. (2018): GEM Entrepreneurial Ecosystem Index 2018 Pilot Report. Report submitted to Research Innovation and Advisory Committee (RIAC) of the Global Entrepreneurship Monitor (GEM) internal report for RIAC.
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- Sternberg, R.; Wallisch, M.; Gorynia-Pfeffer, N.; **von Bloh, J.**; Baharian, A. (2018): Global Entrepreneurship Monitor (GEM). *Länderbericht Deutschland 2017/18*. Eschborn und Hannover; RKW Kompetenzzentrum und Institut für Wirtschafts- und Kulturgeographie, Leibniz Universität Hannover.
- 2017 Sternberg, R.; **von Bloh, J.** (2017): Global Entrepreneurship Monitor (GEM). *Länderbericht Deutschland 2016*. Hannover: Institut für Wirtschafts- und Kulturgeographie, Universität Hannover.
- 2016 Brixy, U.; Schrüfer, L.; Sternberg, R.; **von Bloh, J.** (2016): Unternehmensgründungen in einer alternden Gesellschaft: Ungenutzte Potenziale bei Frauen und Älteren. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung (= IAB-Kurzbericht 27/2016).
- Sternberg, R.; **von Bloh, J.**; Brixy, U. (2016): Global Entrepreneurship Monitor (GEM). *Länderbericht Deutschland 2015*. Hannover: Institut für Wirtschafts- und Kulturgeographie, Universität Hannover, Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit (IAB).

List of scientific presentations (as of January 2021):

- 14th May 2019 **von Bloh, J.** (2019): Entrepreneurial Ecosystem Composite Index (ESI) by GEM. Presentation at the RKW and hannoverimpuls-Event: „Impulse zur Gestaltung von Gründungsregionen in Deutschland“ in **Hannover**.
- 22nd Jan. 2019 **von Bloh, J.** (2019): Entrepreneurial Ecosystem Composite Index (EECI). GEM 2019 Annual Meeting, **Santiago, Chile**.
- 17th Nov. 2018 **von Bloh, J.** (2018): Das Entrepreneurial Ecosystem der Region Hannover. Ergebnisse einer neuen Datenquelle. Annual Meeting 2018 of the AK Industriegeographie in **Wiesbaden-Naurod**.
- 25th Jul. 2018 **von Bloh, J.**; Mandakovic, V.; Apablaza, M.; Amorós, J.E.; Sternberg, R. (2018): Transnational entrepreneurs: Opportunity-driven enablers of entrepreneurial ecosystems? Presentation at the Global Conference of Economic Geography in **Cologne**.
- 4th Jun. 2018 **von Bloh, J.** (2018): Global Entrepreneurship Monitor 2017/2018: Bericht zur Lage des Unternehmertums in Deutschland: Grundlegende Kennzahlen zur Gründungsaktivität. Presentation at the Convention “Impulse zur Stärkung der Gründungskultur in Deutschland”, Bundesministerium für Wirtschaft und Energie, **Berlin**.
- 6th Feb. 2018 **von Bloh, J.**; Coduras, A.; Sternberg, R. (2018): Entrepreneurial Ecosystems Index with GEM Data: Feasibility and Proposal. Presentation at GEM 2018 Annual Meeting, **Seoul, South Korea**.
- 23rd Jul. 2017 **von Bloh, J.** (2017): Regional systems of entrepreneurship: Explorative study of the region of Hanover. Presentation at the Young Economic Geographer Network (YEGN) in **Goslar**.
- 13th Jul. 2017 **von Bloh, J.** (2017): Regionale Gründungssysteme Eine explorative Analyse der Region Hannover. Presentation at the annual meeting of the Netzwerk der Wirtschafts-Senioren in **Hannover**.
- 23rd Feb. 2017 Sternberg, R.; **von Bloh, J.** (2017): Transnational Diaspora Entrepreneurship - empirische Befunde aus international vergleichender Perspektive, 7. Fachforum Migrantenökonomie in **Weimar**.
- 18th Jan. 2017 Sternberg, R.; **von Bloh, J.** (2017): Regionale Gründungssysteme - eine explorative Analyse für die Region Hannover. Hannoverimpuls GmbH (Netzwerktreffen des ehemaligen EIH e.V.), in **Hannover**.
- 28th Nov. 2016 **von Bloh, J.**; Sternberg, R. (2016) Transnational Diaspora Entrepreneurship (TDE) Meets Global Entrepreneurship Monitor (GEM) at the 2nd International Conference on Migration & Diaspora Entrepreneurship, in **Bremen**.
- 6th Feb. 2016 **von Bloh, J.**; Levie, J.; Amorós, E.A. (2016): Transnational Diaspora Entrepreneurship at GEM 2016 Annual Meeting, in **Boston - MA, USA**.
- 15th Dec. 2015 **von Bloh, J.** (2015): Measuring and monitoring Transnational Diaspora Entrepreneurship – a research agenda at 1st International Conference on Migration & Diaspora Entrepreneurship, in **Bremen**.