

Spatial pattern mining of tech clusters of
dynamics and industry mix based on quantitative
methods in England area, UK

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Abstract

Some abstract text

Declaration

I, Zeqiang Fang, hereby declare that this dissertation is all my own original work and that all sources have been acknowledged. It is xxx words in length

Acknowledgements

I would like to thank blah blah

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Abbreviations

Term	Abbreviation
Digital Elevation Model	DEM
Digital Surface Model	DSM
Digital Terrain Model	DTM

Chapter 1

Introduction

1.1 Background

1. tech cluster development

<https://technation.io/report2021/#uk-trends> tech cluster ttwa In fact, between 2007 and 2014, the number of creative enterprises grew faster than the overall company population in more than nine out of ten of the UK's 228 Travel-to-Work-Area geographies (Mateos-Garcia 2016).

By modeling the evolution of business growth and entry, this research contrasts the dynamics of the process by which regional clusters emerge in the US and UK computer industries. New enterprises are lured to both countries by industrial strength in specific sub-sectors in specific regions. Furthermore, incumbent firms in a cluster that is strong in their particular sub-sector of the industry expand at a quicker rate than the industry average. While there are significant second-order variations between the models estimated for the United States and the United Kingdom, the clustering dynamics appear to be comparable. There is no evidence that clustering effects are weaker in the United Kingdom than in the United States(Baptista and Swann, 1999).

2. dynamics cause better performance

dynamics and entry pattern Many industrial dynamics patterns appear to be shaped by the process by which knowledge is created, gathered, and subsequently destroyed, because it favors the admission of new enterprises, the coexistence of incumbents and new entrants, and, eventually, their selective or combined exit over time (Krafft,2004).

3. industry clustering pattern and economics performances

1.2 Research Question and Objectives

How does tech clusters' dynamics pattern change in UK from 1998 to 2018? /

What factors can affect tech clusters' dynamics pattern change in UK?

To what extent will dynamic change affect tech clusters'performance

1.3 Report Structure

1. data clean
2. tech cluster recognition
3. dynamics index generation
4. hypothesis (OLS estimation)
5. regression
6. residual analysis
7. result interpretation

Chapter 2

Literature Review

2.1 Industry Cluster & Tech Cluster

Tech clusters like Silicon Valley play a central role for modern innovation, business competitiveness, and economic performance. This paper reviews what constitutes a tech cluster, how they function internally, and the degree to which policy makers can purposefully foster them. We describe the growing influence of advanced technologies for businesses outside of traditional tech fields, the strains and backlash that tech clusters are experiencing, and emerging research questions for theory and empirical work.

2.2 Cluster Dynamics

Industrial dynamics and clusters: a survey, regional research. This article reviews clusters and their impact on the entry, exit, and growth of firms, as well as the literature supporting the evolutionary dynamics of cluster formation. This extensive review shows strong evidence that clusters promote the entry of manufacturers, but the evidence that clusters can promote the growth and survival of firms is rather weak. From a number of open-ended questions, this

research extracts various future research paths that emphasize the importance of manufacturer heterogeneity and the exact mechanism that supports the localized economy (Frenken, Cefis and Stam, 2014).

Relative researchers found that industry clustering not only increased firm entry but also firm exit rates. This implied that clusters could emerge and exist because they provide entry opportunities but they do not necessarily generate Marshallian economies that increase firm survival (Boschma, 2015).

by looking at how clusters influence entry, departure, and growth via localization economics, and by taking a long-term look at cluster emergence and evolution.

Entry is strongly influenced by clustering. Empirical research have consistently found that as cluster size grows, so does the rate of admission. Most potential entrepreneurs simply stay in their region of origin, therefore this empirical correlation does not imply that enterprises locate in a cluster because they gain from co-location.

Localization economies appear to play a role in entrance decisions in these research, but only for technologically trailing businesses who stand to gain the most and have the least to lose from co-location (ALCCER and CHUNG, 2007).

Enterprise entry does play an important role in shaping the overall dynamics. The new entrants that survive in the cluster will become larger over time, resulting in broader expansion and overall impact (Clementi & Palazzo, 2016) https://pages.stern.nyu.edu/~gclement/Papers/Entry_exit.pdf

2.3 Industry Mix

On average, companies in large cities are more productive. There are two main explanations: corporate choice (big cities strengthen competition and only allow the most productive people to survive) and agglomeration economies (big cities promote interaction and increase productivity), which may be strengthened by

the natural advantages of localization. In order to distinguish them, we nested a general version of the easy-to-handle company selection model and a standard agglomeration model. Stronger choices in large cities cut the distribution of productivity to the left, while stronger gatherings move to the right and expand the distribution. Using this forecast, French firm-level data, and new quantile methods, we show that firm choices cannot explain differences in spatial productivity. The results are applicable to various departments, city size thresholds, institutional samples and regional definitions.

The Herfindahl–Hirschman Index (HHI) is a commonly used economic concept in competition law, antitrust[1], and technology management. It's a measure of a company's size in relation to the industry it's in, as well as an indicator of how competitive it is (Liston-Heyes & Pilkington, 2004).

2.4 How location affect entry pattern in UK/Global

2.5 How time affect entry pattern in UK/Global

2.6 Other factor can affect dynamics pattern in UK

Firm density has a beneficial effect on entry rates in the early stages of an industry since each firm has the potential to bring in new entrants. Legitimation has been coined to describe this positive density impact. Higher company density levels, on the other hand, become a barrier to entrance as the industry evolves and grows, owing to fierce market competition (Boschma, 2015).

Chapter 3

Methodology

3.1 Research Framework

1. Data Clean & Select
2. Identifying Tech Cluster
3. Measuring the Dynamics & Industry Mix
4. Quantitative Method Research
5. Temporal Qualitative Analysis

In this study, a data set containing all companies in UK will be cleaned and attribute selected, and technology companies will be identified and screened according to the classification and definition of technology companies on the official website of the British government. Before the quantitative study, this study is based on time and The spatial dimension counts the number of technology companies, and calculates the dynamic indicators of enterprise clusters and industrial combination indicators in a specific year and a specific region. Then this study conducts multiple regressions, univariate and bivariate variables Moran index testing to conduct spatial quantitative research, and finally combines Qualitative spatial pattern trend research on the spatial changes of indicators in three different time periods.