

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

# Contents

# List of Figures

# List of Tables

# 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
2. dynamics cause better performance
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.

## **2.3 Location Quotient**

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.

## **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**

# 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

## 3.2 Data Source and Processing

This raw dataset is collected from the core company data from Open Corporates master company database (Open Corporates, 2018). And the size of dataset accounts for 15 GB which is handled with `read_stata` and `get_chunk` function to read large data file in chunks, then increasing the reading speed. The “primary uk sic 2007” identification field is the basis of industry finding and the “birth year” is the key to measure dynamics variables . All rows whose these two values are empty are removed 17% incorporate date is missing and sic code is complete).

## 3.3 Identifying Tech Cluster

For the identification of science and technology companies, this study introduces the main 2007 sic code table to judge the science and technology industry, referring to the classification method of the Science and Technology Classification data set on the ons.gov.uk website; in order to better identify science and technology companies for the UK The economic contribution is officially based on the 2007 British Standard Economic Activity Classification, combined with different data sources, to classify and label science and technology companies (Office for National Statistics, 2015).

This research refers to the science and technology classification table provided by the government. The technology indicator is used to position the technology industry of all industries, and a total of 168 sic codes for the technology industry in 2007 were obtained, accounting for about 16% of all industry categories in the UK, including 5 industry categories such as Digital Technologies, Life Sciences & Healthcare, Publishing & Broadcasting , Other scientific/technological manufacture and Other scientific/technological services, details of the