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Postgraduate Theses on Industrial Clustering: Bibliometric Analysis

Endüstriyel Kümelenme ile İlgili Lisansüstü Tezler: Bibliometrik Analiz

Gökçe TUĞDEMİR KÖK, Didem ÖZER ÇAYLAN

ABSTRACT

This study aims to evaluate development of postgraduate theses on the industrial cluster and clustering in Turkey with their theories within the framework of bibliometric analysis of various parameters. The aim is to reveal the general characteristics of the postgraduate theses related to industrial clustering and to guide future research in this field by bibliometric analysis. For this purpose, 121 postgraduate theses which are scanned in the database of National Thesis Center between 2004 and 2020 are examined with regards to bibliometric parameters such as degree of postgraduate theses, distribution of master's degree and doctorate theses by language, years, universities, institutes, departments, the title of advisors, number of pages, subjects, theoretical foundation, research type and data collection tools, distribution of sampling by sector and province, research method, most frequently keywords and most frequent words in theses title. In the study, the information about the postgraduate theses has been analyzed by using the Microsoft Office Excel program and the frequency and percentage analysis of the data are performed. It has been revealed that the studies have gained momentum since 2010 and the writing language is generally Turkish. Due to the multidisciplinary nature of industrial clustering, postgraduate theses have been written in many departments and institutes affiliated with universities. It has been concluded that quantitative methods are preferred more, and the applications are mostly carried out in the textile and tourism sectors in the sampling theses. This study provides to understand general characteristics of postgraduate literature and wider perspective to future industrial clustering studies by means of various bibliometric parameters.

Keywords: Bibliometric Analysis, Cluster, Industrial Clustering, Postgraduate Theses

ÖZ

Bu çalışma, Türkiye'deki endüstriyel küme ve kümelenme üzerine lisansüstü tezlerinin gelişimini teorileri ile birlikte çeşitli parametrelerin bibliyometrik analizi çerçevesinde değerlendirmeyi amaçlamaktadır. Amaç, endüstriyel kümelenme ile ilgili lisansüstü tezlerinin genel özelliklerini ortaya çıkarmak ve bibliyometrik analiz ile bu alanda gelecekteki araştırmalara rehberlik etmektir. Bu amaçla 2004-2020 yılları arasında Ulusal Tez Merkezi veri tabanında taranan 121 lisansüstü tezi, lisansüstü tezlerin derecesi, yüksek lisans ve doktora tezlerinin dile, yıllara, üniversitelere, enstitülere ve bölümlere göre dağılımı, danışman unvanları, sayfa sayısı, konular, teorik temel, araştırma türü ve veri toplama araçları, örneklemin sektöre ve illere göre dağılımı, araştırma yöntemi, en sık kullanılan anahtar kelimeler ve tez başlığında en

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sık kullanılan kelimeler gibi bibliyometrik parametreler açısından incelenmektedir. Çalışmada lisansüstü tezlere ilişkin bilgiler Microsoft Office Excel programı kullanılarak analiz edilmiş ve verilerin frekans ve yüzde analizlerine yer verilmiştir. Çalışmaların 2010 yılından itibaren ivme kazandığı ve yazı dilinin genel olarak Türkçe olduğu ortaya çıkmıştır. Endüstriyel kümelenmenin multi-disipliner doğası nedeniyle, üniversitelere bağlı birçok bölüm ve enstitüde lisansüstü tezler yazılmıştır. Örneklemdeki tezlerde kantitatif yöntemlerin daha çok tercih edildiği, uygulamaların daha çok tekstil ve turizm sektörlerinde yapıldığı sonucuna varılmıştır. Bu çalışma, çeşitli bibliyometrik parametreler aracılığıyla lisansüstü tez literatürünün genel özelliklerini ve gelecekteki endüstriyel kümeleme çalışmalarına daha geniş bir bakış açısını anlamayı sağlar.

Anahtar Sözcükler: Bibliyometrik Analiz, Küme, Endüstriyel Kümelenme, Lisansüstü Tezler

INDUSTRIAL CLUSTERING

It is accepted that the industrial clustering started with Marshall, whose entry into the literature on economics and business management. Marshall mentioned industrial districts in *"The Concentration of Specialized Industries in Particular Localities"* session of *"Principles of Economics"* book published in 1890. When an industry chooses a location for itself, it is likely to stay there for a long time. Because people who follow the same skilled trade have more advantages from the close neighborhoods (Marshall, 2013). According to Alsaç (2010); the studies after Marshall focused mainly on the selection of the location of the enterprises. Until the 1970s, the positive externalities that would emerge with the network of businesses to establish were not taken into consideration. While many Fordist mass-producing industrial enterprises were adversely affected by the economic crisis that emerged in the 1970s, small and medium-sized enterprises in North / Central Italy survived the crisis successfully (Eraydın et al., 2005).

Porter is the scientist who first conceptualized and introduced the cluster. In his book *"The Competitive Advantage of Nations"*, Porter (1990) searched for an answer to the question of "why a country has achieved international success in a certain industry". Porter identified the industries in which countries have a competitive advantage as part of the study. When the determined industries are examined in detail, the determinants of competitiveness that are thought to bring success are defined. These determinants are defined as Diamond Model (factor conditions; demand conditions; related and supporting industries; firm, strategy, structure, and rivalry; government and chance). In his study, Porter also found that the location of competitive industries in countries is not geographically dispersed. Clusters play an important role in competition and have significant consequences for businesses, governments, universities, and other institutions in an economy (Porter 1998).

Different definitions of clustering are given in Table 1. Andersson (1985) determines the elements of the cluster as follows: (1) tougher factors such as geographical concentration, social capital and learning process, soft or external economic scale, (2) all players unite around specialization or a common core activity, (3) many players; clusters are made up of not only businesses but also public institutions, academic environment, financial sector players, (4) Cluster lifeline cycle (emergence, growth, change or disappearance of the cluster) and (5) Innovation, technological, commercial and/or organizational change. According to Simmie (2004), the characteristics of the cluster are; agglomeration and interconnection. Interconnection is considered as competitive and collaborative relationships that have arisen between local actors. Agglomeration reflects the geographical concentrations of industry and related activities.

LITERATURE REVIEW: RESEARCH on BIBLIOMETRIC ANALYSIS of POSTGRADUATE THESES

One of the most up-to-date methods used to examine the development of a discipline is bibliometric analysis (Güçlü Nergiz, 2014). It is suggested that the bibliometric method, which enables the analysis of publications, was first used in 1969 (Broadus, 1987). With this method, it is emphasized that by examining the studies published in an academic field within the framework of different bibliometric features (subject, year, contributing institution, keywords used, number of authors of the works, citations, common citations, etc.), some findings regarding scientific communication are obtained (Çiçek and Kozak, 2012). These reviews reveal the current development of studies in a field and guide future research (Aydın, 2014). When the studies in which bibliometric analysis is applied are examined, it is seen that the studies generally take place in the context of books, articles, papers and postgraduate theses (Tayfun et al., 2018). It is seen that the parameters used in bibliometric analysis studies carried out on postgraduate theses have increased over the years and these studies have become quite popular (Temizkan et al., 2015).

In the international literature, it is seen that postgraduate theses are analyzed with the bibliometric method, mostly for a university. Krishna (2005) evaluated 68 doctoral theses in Rajasthan Agricultural University Bikaner between 1996 and 2000 in his own doctorate thesis. He analyzed these theses according to the following dimensions: subject, citation, language-wise distribution of cited documents, the geographical distribution of cited journals and books, chronological distribution of cited journals, comparative study of the chronological distribution of cited journals and books, obsolescence of cited journals showing citations, median citation age of journals and books, ranking of cited journals, authorship pattern, ranking of authors, author's citations pattern and distribution of cited journals. 106 doctoral theses in the field of commerce in Periyar University are analyzed according to the following bibliometric characteristics: year-wise distribution of doctoral theses, the number of chapters,

Table 1: Definitions of Clustering

Author, year	Definitions
Marshall, 1920	Three distinct drivers of agglomeration: input-output linkages, labor market pooling, and knowledge spillovers. Each of these mechanisms is associated with cost or productivity advantages to firms.
Rosenfeld, 1997	A Cluster is a formation that is formed by the concentration of similar, related, and complementary business groups in a geographical area, is open to communal business activities, communication, and dialogue, sharing common opportunities and threats by sharing specialized infrastructure, labor, and services.
Porter, 1998	Clusters are the geographic location of related firms, service manufacturers, specialized suppliers, firms in related industries, and associated organizations (universities, think tanks, standards-setting agencies, vocational training providers, and trade associations) that compete with each other in a particular field but also cooperate.
Enright & Roberts ,2001	Clustering is a combination of firms and organizations producing interrelated goods and services.
Crouch & Farrell, 2001	Clusters tend to be close to firms that do the same or similar businesses.
Bapista, 2001	Clustering can be defined as the gathering of sectoral concentrated enterprises in the same geographical area.
UNIDO, 2001	Clusters are the sectoral and geographical concentration of the selling organizations that produce interrelated or complementary product diversity.
Morosini, 2004	The cluster is a community of people who are located close to each other in a certain place or a group of economic players with a socio-economic presence.
Flowers & Easterling, 2006	Clustering is a combination of each other and affiliated companies and institutions that create a greater value than the sum of individual values.
US Council on Competitiveness, 2007	Clustering is the collaboration between independent enterprises, which operate in a certain sector and region, to establish tight collaborations among them, to share their facilities, knowledge and expertise, to act together for technology transfer, to create networks and to disseminate information.
OECD, 2009	Clusters are a geographic concentration of institutions and organizations working in related activities.
Öcal and Uçar, 2011	Clusters constitute a specific area with easy information flows, face-to-face relationships, R&D activities, advanced services, skilled workforce, collaboration, and the ability to benefit from local social capital.
Nallari and Griffith, 2013	An industrial cluster represents an agglomeration of diverse actors—firms, suppliers, service providers, and related companies—in a specific industry

gender diversity of researcher used in doctoral theses, references, authorship pattern of the reference, bibliographic forms of references, ranking of the journals and subject-wise distribution (Kavitha and Sivaraj, 2014). Bibliometric analysis was used by Angammana and Jayatissa (2015) to analyze 50 master theses at the University of Colombo and 20 master theses at the University of Kelaniya. 414 theses at the School of Nuclear and Allied Science were analyzed 2008 and 2016 at the University of Ghana (Bilson et al., 2019).

47 doctorate theses related to Sociology and 234 references at Devi Ahilya Vishwavidyalaya between 2000 and 2006 were investigated with regards to the year, length, number of chapters, illustrations used, references, authorship pattern, ranking of periodical/ journals, distribution of cited journals (Mandloi and Mishra, 2016). Mondal and Roy (2018) analyzed the citation of doctoral theses in the field of Mathematics at University of Burdwan between 2005 and 2012.

Studies that investigated postgraduate theses with bibliometric analysis have been found to analyze country-wise in international literature. Reibnitz et al., (2012)'s bibliometric study evaluated 67 theses and 6 dissertations in the Coordination for the Improvement of Higher Education Personnel (CAPES) portal in Brasilia in terms of Year of publication, university, Care fields and Study's settings between 2000 and 2008. Pizzani et al. (2012) performed a bibliometric analysis of theses in the Capes database between 1987 and 2009. They evaluated 1173 theses in terms of year of defense, identification of the higher education institution,

academic level (masters' degree, doctoral degree, professional master's degree), Brazilian geographic region, development agencies that supported the investigation, keywords, the type of resulting scientific literature (books, articles and book chapters), author of articles, the title of the articles, resulting from scientific production (articles and publication in books). Samzugi and Mwinyimbegu (2015) examined master theses in Tanzania with regard to citation patterns. 169 doctoral theses in and Information Science (LIS) of Indian Universities between 1993 and 1997 evaluated with bibliometric characteristics such as year, university, state, subject and advisor (Singh, 2015).

Considering Turkish authors' studies, it was seen that the studies included all universities and the data were obtained from the database of the Directorate of Council of Higher Education (Table 2). Tourism-related theses have mostly been studied in national literature.

Academic degree of theses, university, institute, department, year, advisor title, language, subject, sampling, research method, research area, data collection tool, number of pages and references and keywords mostly used as bibliometric characteristics for postgraduate theses. Bibliometric characteristics which are the availability of content, hypothesis, model, validity and reliability, aim in the abstract, research method in abstract, gender of authors and advisors, title of supervisor, jury, permission status and journal index in published articles were also used in the bibliometric analysis of postgraduate theses in national literature.

In literature, it has been reached only one study about postgraduate theses on industrial clustering. Saatçi and Yalçınkaya (2019) evaluated 66 theses between 2006 and 2017 with regards to years, type, university, institute, department, subject, keywords, research type, language, academic titles of advisors and average page range. The research gap is a limited study about bibliometric analysis of postgraduate theses related to industrial clustering, limited bibliometric parameters and choosing limited keywords to find suitable theses for the subject.

Table 2: National Researches on Bibliometric Analysis of Postgraduate Theses

Topics	Author, Year
Accounting	Çoban-Çelikdemir, 2019
Agricultural Tourism	Akkaşoğlu, 2019
Augmented Reality	Altınpuluk, 2017
Cinema	İnceoğlu, 2014
Competition	Şahin et al., 2019
Cultural Heritage	Çelebi et al., 2020
Destination	Aydın and Aksöz, 2019; Ünal and Bayar, 2020
Digital Transformation	Özispa and Akdaş, 2019
Entrepreneurship	Kılıç et al., 2017
Food and Beverage	Aydın 2014; Ayaz and Türkmen, 2018; Tayfun et al., 2018
Gastronomy	Sünnetçioğlu et al., Altaş and Acar, 2018
Health Management	Gül et al., 2015
Industrial Clustering	Saatçi and Yalçınkaya, 2019
Management Fashion	Armutlu and Sağlam Arı, 2010
Organizational Behavior	Coşkun and Tabak, 2017
Organizational Commitment	Yeksan and Gümüş, 2019
Ornithology	Per and Uzuner, 2020
Pedagogical and Content Knowledge	Yalçın et al., 2017
Province basis	Çelikkaya, 2018; Sarıçiçek and Aytekin, 2019
Rural Tourism	Albayrak and Tüzünkan, 2020
Scientific Communications	Özenç Uçak and Al, 2009
Sports Medicine	Ercan, 2020
Tourism	Turan, 2014; Güçlü Nergiz, 2014; Tekin, 2016; Güdü-Demirbulat and Tetik-Dinç, 2017; Civelek-Oruç and Türkay, 2017
Tourism Marketing	Kozak, 2001; İnce et al., 2017
Travel Marketing	Arıca, 2014
University bases	Mendeş-Pekdemir et al., 2015; Tayfun et al., 2016

METHODOLOGY

Examining the postgraduate theses, which are one of the most important tools in the development of a discipline, is an important issue in terms of monitoring the development process of the relevant discipline and seeing the direction of development (Kervankıran and Şardağ, 2018). The purpose of this study is to evaluate development of postgraduate theses on the industrial cluster and clustering in Turkey within the framework of bibliometric analysis of various parameters. The aim is to reveal the general characteristics of the literature on industrial clustering and to guide future research in this field by bibliometric analysis. Within the scope of the study, *"cluster"* or *"clustering"* words in the title are included in National Thesis Center Database. 913 theses were reached with the word *"cluster"* and 448 theses were reached with the word *"clustering".* Subject as actuarial sciences, astronomy and space sciences, computer engineering, physics, mathematics, information and records management, biostatistics, bioengineering, biotechnology, electrical and electronics engineering, education and training, statistics, geodesy and photogrammetry, machine engineering, subject related medicine were excluded within the scope of the study. Postgraduate theses related to the industrial cluster/ing have been included in the analysis.

The sample of this study is 121 postgraduate theses on clustering from the database of the Directorate of Council of Higher Education (YÖKTEZ) between 2004 and 2020. These theses have been evaluated with regards to the degree of postgraduate theses, distribution of master's degree and doctorate theses by language, years, universities, institutes, departments, title of advisors, number of pages, subjects, research type and data collection tools, distribution of sampling by sector and province, research method, most frequent keywords and most frequently words in theses title are also used as bibliometric parameters. After downloading the theses from the database, their data has been transferred to the Excel program and analyzed.

RESULTS

A total of 123 postgraduate theses has been identified in National Thesis Center databases. 2 of them were not accessible and were not included in the sample because access was not granted by the author. Within the scope of the research findings, firstly, the distribution of postgraduate theses on clustering within the National Thesis Center has been determined 63 (52.07%) of the graduate theses consisted of master's theses and 58 (47.93%) of them were doctorate theses (Figure 1).

According to the writing language (Table 3), 104 (86%) of the theses are Turkish and 17 (14%) of them are in English.

According to the criteria determined in this research, the master's thesis on clustering was first written in 2004 and the doctoral thesis in 2006 (Figure 2). The most written year of the master's thesis is 2019 with 10 theses. Doctorate theses are written with 10 theses in 2015 at the most. In total, the most

Table 3: Distribution by Language

Language	Master's Degree	Doctorate	Total	%
Turkish	53	51	104	86
English	10	7	17	14
Total	**63**	**58**	**121**	**100**

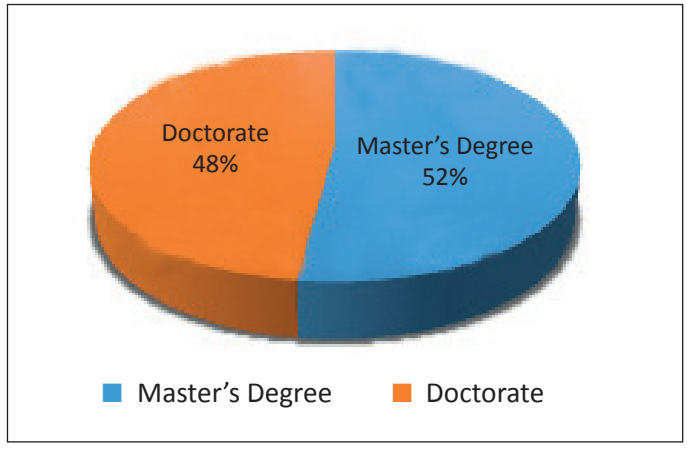

Figure 1: Degree of postgraduate theses.

theses production year is 2019 (13.22%). Most postgraduate theses were published between 2013 and 2015.

While the theses are completed depending on 54 universities in total, it can be said that there are great differences in the distribution (Table 4). It is seen that Istanbul Technical University (10 theses, 8,26) has the highest number of graduate thesis studies among universities. This is followed by Dokuz Eylül University (6), Gazi University (6), Middle East Technical University (6) and Süleyman Demirel University (6). Most master's degree theses are produced in Istanbul Technical University (8) and most doctorate theses are produced in Dokuz Eylül University (5).

When the institutes where the theses were completed are examined, most of the postgraduate theses are completed in the Social Science Institute (80; 66.11%). 27 postgraduate theses are published by the Institute of Natural and Applied Sciences (22.31%). Postgraduate theses are completed in 11 different institutes in total (Table 5).

Postgraduate theses have been prepared in 35 different departments. In Table 6, department-related business (27.27%) ranks first in the distribution of graduate theses on industrial clustering. Of these theses in the department-related business, 36% are master's degree and 64% are doctoral theses. This is followed department-related city and regional planning ranks with 19% and department-related economics ranks with 18.18 %.

Figure 3 contains the distribution of postgraduate theses according to the title of the advisor. Postgraduate theses are

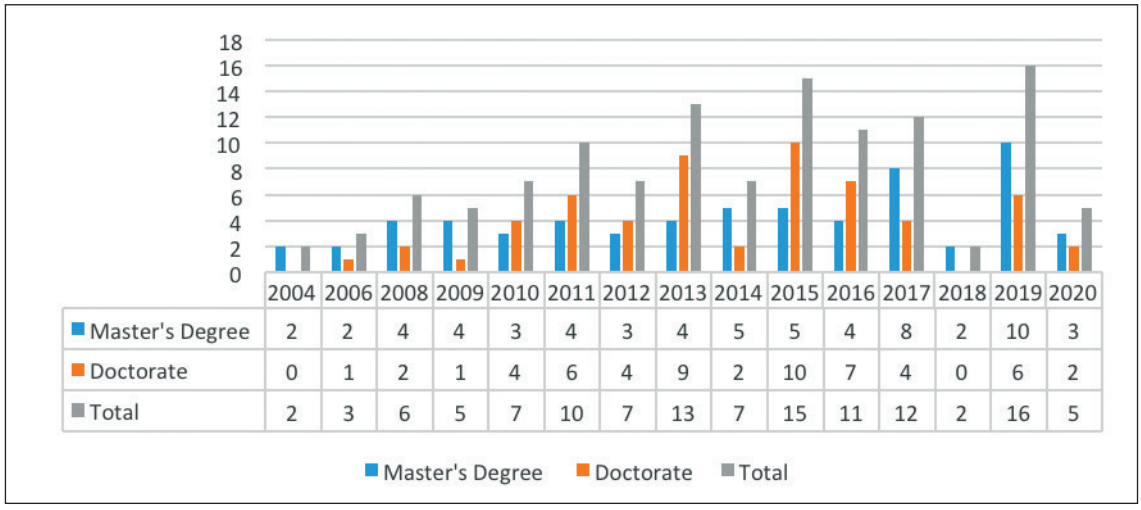

Figure 2: Distribution of master's degree and doctorate theses by years.

Table 4: Distribution of Master's Degree and Doctorate Theses by University

Name of the University	Master's Degree	Doctorate	Total	%
Istanbul Technical University	8	2	10	8.26
Dokuz Eylül University	1	5	6	4.95
Gazi University	5	1	6	4.95
Middle East Technical University	3	3	6	4.95
Süleyman Demirel University	2	4	6	4.95
Akdeniz University	3	2	5	4.13
Sakarya University	3	1	4	3.3
Selçuk University	2	2	4	3.3
Ankara University	2	1	3	2.48
Celal Bayar University	1	2	3	2.48
Çukurova University	-	3	3	2.48
Istanbul University	1	2	3	2.48
Kahramanmaraş Sütçü Imam University	1	2	3	2.48
Marmara University	2	1	3	2.48
Yıldız Techical University	1	2	3	2.48
Adnan Menderes University	-	2	2	1.65
Afyon Kocatepe University	1	1	2	1.65
Bartın University	1	1	2	1.65
Beykent University	-	2	2	1.65
Boğaziçi University	1	1	2	1.65
Ege University	-	2	2	1.65
Gaziosmanpaşa University	-	2	2	1.65
Istanbul Trade University	2	-	2	1.65
Mimar Sinan Fine Arts University	1	1	2	1.65
Necmettin Erbakan University	2	-	2	1.65
Okan University	1	1	2	1.65
Turkish Military Academy	-	2	2	1.65
Yeditepe University	1	1	2	1.65
Abant Izzet Baysal University	1	-	1	0.83
Anadolu University	-	1	1	0.83

Table 4: Cont.

Name of the University	Master's Degree	Doctorate	Total	%
Atatürk University	-	1	1	1.65
Atılım University	1	-	1	0.83
Aydın Adnan Menderes University	-	1	1	0.83
Batman University	1	-	1	0.83
Burdur Mehmet Akif Ersoy University	1	-	1	0.83
Çanakkale Onsekiz Mart University	1	-	1	0.83
Dumlupınar University	-	1	1	0.83
Erciyes University	-	1	1	0.83
Erzurum Technical University	1	-	1	0.83
Fatih University	1	-	1	0.83
Hasan Kalyoncu University	1	-	1	0.83
Isparta University of Applied Sciences	1	-	1	0.83
Izmir Institute of Technology	-	1	1	0.83
Karadeniz Technical University	1	-	1	0.83
KTO Karatay University	1	-	1	0.83
Kütahya Dumlupınar University	1	-	1	0.83
Maltepe University	-	1	1	0.83
Nevşehir Hacı Bektaş Veli University	1	-	1	0.83
Niğde University	1	-	1	0.83
Nişantaşı University	1	-	1	0.83
Pamukkale University	-	1	1	0.83
Sivas Cumhuriyet University	1	-	1	0.83
War Academy	1	-	1	0.83
Yaşar University	1	-	1	0.83
Total	63	58	121	100

Table 5: Distribution of Master's Degree and Doctorate Theses by Institute

Institute	Master's Degree	Doctorate	Total	%
Social Sciences	41	39	80	66.11
Natural and Applied Sciences	13	14	27	22.31
Postgraduate Education	1	2	3	2.48
Defense Science	-	2	2	1.65
Educational Sciences	2	-	2	1.65
Science Engineering and Technology	2	-	2	1.65
Engineering and Science	-	1	1	0.83
Foreign Trade	1	-	1	0.83
Modern Turkish History	1	-	1	0.83
Strategic Studies	1	-	1	0.83
Business	1	-	1	0.83
Total	**63**	**58**	**121**	**100**

discussed in this table in three categories according to the title degree. Postgraduate theses written on industrial clustering are mostly prepared under consultancy of Prof. (52.07%) and also doctorate theses are mostly prepared the consultancy of Prof. (40 theses, 63.5%).

When 121 postgraduate theses are examined, the master's theses with the minimum number of pages consists of 67 pages and at most 329 pages. Among doctorate theses, the lowest number of pages is 131, while the highest number of pages is 494. Therefore, it is seen that postgraduate theses are at least 67 and at most 494 pages. The page ranges of the theses were also determined in the study and are presented in Figure 4. When all postgraduate theses are considered, it is seen that 54.55% of the theses are 101-200 pages, 27.7% are 201-300 pages and 10.74% are between 301-400 pages.

Table 6: Distribution of Master's Degree and Doctorate Theses by Department

Department	Master's Degree	Doctorate	Total	%
Business / Business Administration /	12	21	33	27.27
City and Regional Planning/City Planning / Regional Planning / Urban and Regional Planning / Urban Design / Urban Planning / Urbanism	12	11	23	19
Economics / Agricultural Economics / Labor Economics	11	11	22	18.18
Management / Management and Organization	4	3	7	5.79
Tourism Management	4	3	7	5.79
Finance	1	3	4	3.3
Geography / Geography Education / Human and Economic Geography	2	2	4	3.3
Industrial Engineering	2	-	2	1.65
International Trade / International Trade and Finance	2	-	2	1.65
Marketing	2	-	2	1.65
Production Management and Marketing	2	-	2	1.65
Science and Technology Policy Studies	2	-	2	1.65
Technology Management	-	2	2	1.65
Defense Resources	1	-	1	0.83
Economic Policy	1	-	1	0.83
Forest Industry Engineering	-	1	1	0.83
Industrial Policy and Technology Management	1	-	1	0.83
International Business	1	-	1	0.83
Logistics Management	1	-	1	0.83
Management Engineering	1	-	1	0.83
Maritime Transportation and Management Engineering	-	1	1	0.83
Modern Turkish History	1	-	1	0.83
Total	**63**	**58**	**121**	**100**

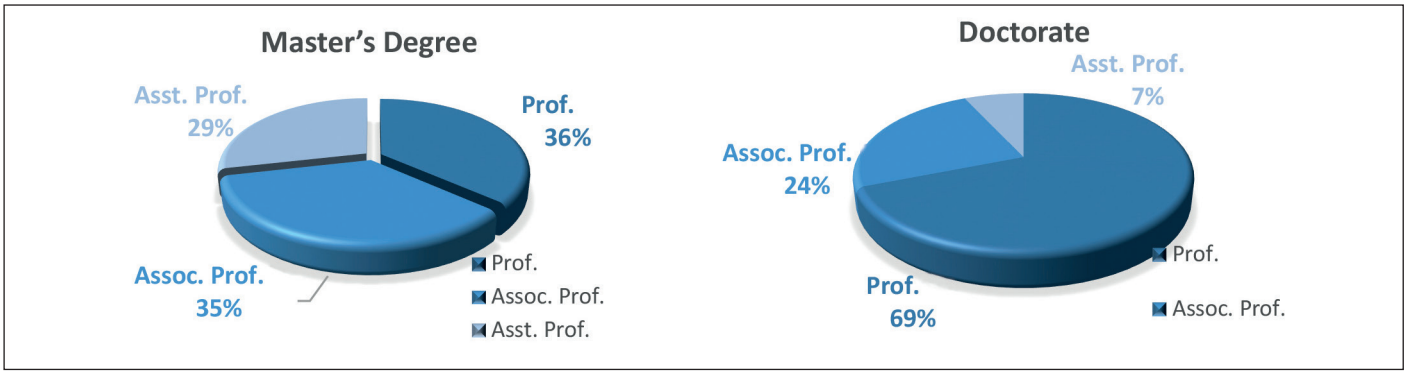

Figure 3: Distribution of master's degree and doctorate theses by title of advisors.

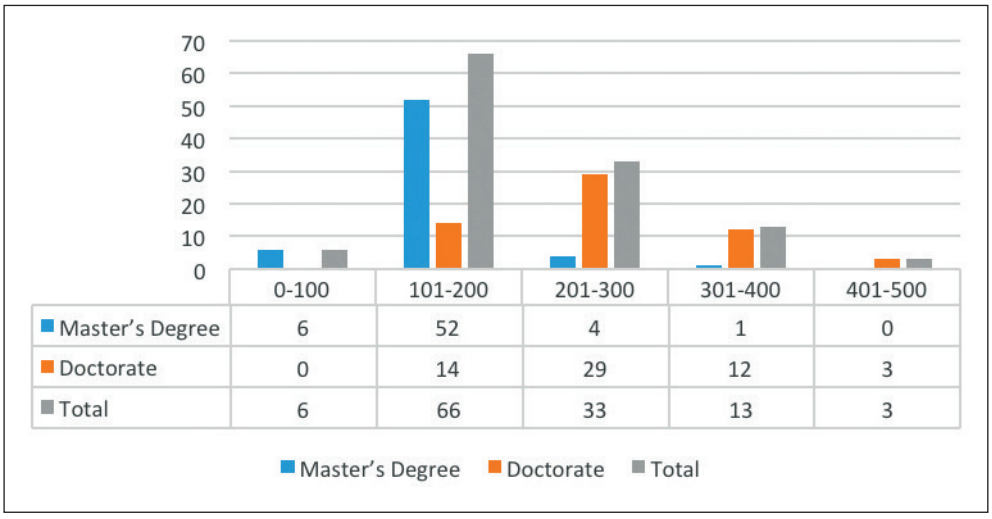

Figure 4: Distribution of master's degree and doctorate theses by number of pages.

Table 7: Distribution of Master's Degree and Doctorate Theses by Subjects

Subjects	Master's Degree	Doctorate	Total	%
Business Administration	31	33	64	42.1
Economics	14	13	27	17.76
Urban and Regional Planning	13	12	25	16.44
Tourism	5	5	10	6.58
Geography	2	3	5	3.29
Defense and Defense Technologies	3	1	4	2.63
Finance	1	2	3	1.97
Agriculture	1	2	3	1.97
Industrial and Industrial Engineering	2	-	2	1.31
Sociology	2	-	2	1.31
Fine Arts	1	-	1	0.66
Forestry and Forest Engineering	-	1	1	0.66
Labor Economics	-	1	1	0.66
Marine	-	1	1	0.66
Science and Technology	1	-	1	0.66
Transportation	1	-	1	0.66
Industrial Relations	-	1	1	0.66
Engineering Science	1	-	1	0.66
Total	**78**	**74**	**152**	**100**

Considering the distribution of theses according to their subjects (Table 7), it is seen that 42.1% of them are business administration. For the distribution according to the subjects, the subject heading in the explanation in National Theses Center has been taken into consideration. More than one subject is specified for some theses. Economics (17.76%) and urban and regional planning (16.44%) are also the most stated subjects.

When postgraduate theses are analyzed in terms of the theoretical foundation, the theories are generally given historically and are based on Clustering Theory developed by Porter. In addition to Porter's Clustering Theory, Economic Growth Theories, Network Theory and Agglomeration Economics Theories are frequently encountered in postgraduate theses on industrial clustering. The distribution of Postgraduate theses by the theoretical foundation is given in Table 8.

Quantitative methods have been preferred in 49.59% of studies (Figure 5). In master's degree, 31 theses used quantitative method, 23 theses used qualitative method, 9 theses used mixed method. 29 doctorate theses used quantitative as research type, 18 theses used qualitative methods, and 11 theses used qualitative methods.

Table 8: Distribution of Master's Degree and Doctorate Theses by Theoretical Foundation

Theoretical Foundation	Master's Degree	Doctorate	Total	%
Porter's Clustering Theory (Diamond Model)	50	46	96	68.08
Economic Growth Theories (Endogenous Economic Growth Theory, Regional Development Theory, Regional Economic Growth Theory)	5	3	8	5.67
Network Theory	3	4	7	4.96
Agglomeration Economics Theories (Marshallian, Dynamic Externalities Theory)	3	3	6	4.26
Resource-Based View	1	3	4	2.84
Industrial Theories (Modern Industry Theory, Cultural Industry Theory, Industrial Dynamics Theory)	3	1	4	2.84
Economic Location Theory	-	3	3	2.12
System Theory	-	2	2	1.42
Innovation Theories (Innovation/ Innovative Clusters / Innovative Milieus)	1	1	2	1.42
Social Capital Theory	-	1	1	0.71
Knowledge Spillover Theory	-	1	1	0.71
Creative Class Theory	-	1	1	0.71
Entrepreneurship Theory	-	1	1	0.71
Local Financing	1	-	1	0.71
Spatial Theory	1	-	1	0.71
Game Theory	1	-	1	0.71
Institutional Theory	-	1	1	0.71
Cluster Supply Chain (CSC) Theory	-	1	1	0.71
Total	**69**	**72**	**141**	**100**

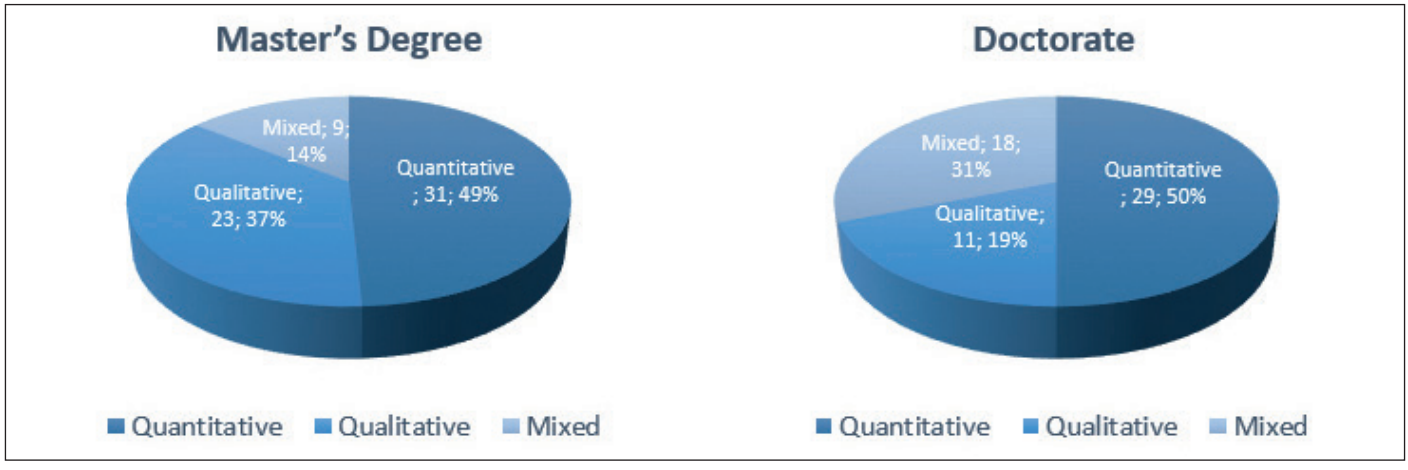

Figure 5: Distribution of master's degree and doctorate theses by research type.

Some postgraduate theses use multiple tools to collect data. The most used data collection tool is a survey for postgraduate theses on industrial clustering (44.1%). Other commonly used data collection tools are secondary data (29%) and interviews (18.6%). In master theses, observation and Delphi are also used as a data collection tool. Focus groups, case study and observations are also used as data collection tools in doctorate theses (Table 9).

Industrial clustering theses often analyze cluster or cluster potential in a particular sector. The sample has been analyzed on a sector basis to see in which sectors the studies are mostly conducted. As seen in Table 10, most of the theses are carried out in the textile sector (8.08%) and the tourism sector (7.34%). In 6.61% of the studies, the clustering potential in all sectors in a city has been examined, and in 5.88% the implementation has been carried out in the organized industrial zone, not on a sector basis.

Table 9: Distribution of Master's Degree and Doctorate Theses by Data Collection Tools

Data Collection Tools	Master's Degree	Doctorate	Total	%
Survey	33	43	76	44.18
Secondary	31	19	50	29.07
Interview	14	18	32	18.6
Focus Group	-	5	5	2.91
Case Study	-	4	4	2.33
Observation	1	3	4	2.33
Delphi	1	-	1	0.58
Total	**80**	**92**	**172**	**100**

Table 10: Sampling by Sector

Sampling Sector	n	%
Textile	11	8.08
Tourism	10	7.34
Furniture	8	5.88
Manufacturing	7	5.14
Automotive	6	4.4
Agriculture	6	4.4
Marina /Shipyard/ Yacht Produce / Maritime	5	3.67
Country-Specific (Turkey)	5	3.67
Fashion / Design	4	2.93
Logistics,	3	2.2
Machine, Electric-Electronic	3	2.2
Marble	3	2.2
Medical	3	2.2
Forest Product, Brick, Fruit and Vegetables, Defense, Knitwear, Shoe, Techno-City / Techno-Park / Cyber-Park, Carpet, Air-Conditioning / Cooling, Ceramic	2 for each	1.47 for each
Egg Producer, Tile, Cold Chain, Renewable Energy and Environmental Technology, Red Meat, Livestock Breeding, Casting, Jewelry, Cluster Incentives, Towel – Bathrobe, White Goods Sub-Industry, Health Facilities, Press, Heavy Equipment, Italian Industrial, Organic Food / Pepper, Natural Stones, Wearing Appeal, Tire, Plastic, Recycling, Software / R&D, Akhi Organization, Cluster Specialists, Retail	1 for each	0.74 for each
Province Specific	9	6.61
Organized Industrial Zone	8	5.88
Total	**136**	**100**

Whenever a particular cluster is mentioned, a specific province is also mentioned. For this reason, after the sector-based analysis of the sample, a province-based analysis was also carried out in Table 11. Most of the studies are realized in Istanbul (10.87%). The number of studies countrywide (Turkey) (9.79%) is quite high. Clustering studies were carried out in 52 cities in total. Some theses have been realized in one more sector and province.

After examining the research type, data collection tool and a sample of the studies, the method of the research has been also analyzed in Table 12. Multiple methods are used in postgraduate theses related to industrial clustering. Generally descriptive (19.85%) and statistical analysis (17.94%) have been used as the research methods in postgraduate theses on industrial clustering. A cluster-specific method such as clustering map, diamond model, location quotient analysis, three-star analysis etc. is also frequently used as the research methods.

The most common keywords which have been used in postgraduate theses are "*clustering", "cluster", "competition"* and *"innovation".* The most used 20 words in the keyword group in postgraduate theses are given in Table 13.

Table 11: Sampling by Province

Sampling Province	n	%
İstanbul	20	10.87
Ankara	17	9.24
Antalya	13	7.07
İzmir	11	5.98
Konya	9	4.89
Kocaeli	7	3.8
Bursa	7	3.8
Denizli	5	2.72
Muğla, Kayseri, Eskişehir, Isparta	4 for each	2.17 for each
Aydın, Mersin, Afyonkarahisar, Kütahya, Bilecik, Manisa, Burdur, Sakarya	3 for each	1.64 for each
Gaziantep, Erzurum, Kahramanmaraş, Uşak, Çorum, Adıyaman	2 for each	1.09 for each
Zonguldak, Kırgizistan, Tokat, Erzincan, Bayburt, Hatay, Osmaniye, Kırklareli, Edirne, Diyarbakır, Nevşehir, Samsun, Bartın, Çorlu, Batman, Sivas, İnegöl, Tekirdağ, Balıkesir, Çanakkale, Düzce, Bolu, Yalova, Adana	1 for each	0.54 for each
Total	**184**	**100**

Table 12: Research Method

Research Method	Total	%
Descriptive Analysis	52	19.85
Statistical Analysis (Chi-Square, T-Test, Anova, Factor, Correlation, Hypothesis tests, Frequency)	47	17.94
Clustering map	16	6.11
Diamond model	15	5.73
Regression Analysis	15	5.73
Location Quotient Analysis	13	4.97
Clustering methods (cluster relation, cluster strategic plan, cluster sustainability model, cluster business model, cluster potential model)	12	4.59
Network Analysis / Social Network Analysis	10	3.82
SWOT Analysis	9	3.44
Three Star Analysis	7	2.67
Case Analysis	6	2.3
Content Analysis	5	1.91
Concentration Analysis, Structural Equation Modelling, Comparative analysis	4 for each	1.53 for each
Value Chain Analysis	3	1.15
Competitiveness Analysis, Clustering Analysis, Spatial Econometric Model, Relation Analysis, System Dynamics, HHI Index, Situation Analysis	2 for each	0.76 for each
Impact analysis, AHP, GEM model, Cost Analysis, TOPSIS, Data Envelopment Analysis, Inputs Maturity Model, Scenario Analysis, PEST, Supply Chain Analysis, Gap Analysis, Importance-Performance, Export Timeline Data, Process Analysis, Shift-Share Analysis, Cooperation Analysis, Index Analysis, DFA Analysis, Heckman Selection Model, Entropy, Simulation Analysis, Corporate Qualification Analysis, Supply Side Analysis, Structure Analysis, Logit Model, SOR	1 for each	0.38 for each
Total	**262**	**100**

Table 13: Most Frequently used Keywords

Keywords	n	Keywords	n
Clustering	49	Industrial Clusters	8
Cluster	23	Cluster Analysis	6
Competition	18	Agglomeration	5
Innovation	17	Logistics	5
Competitive Advantage	11	Cooperation	4
Small and Medium-Sized Firms	11	Economic Geography	4
Competitiveness	10	R&D	4
Clusters	9	Entrepreneur	3
Diamond Model	9	Social Network Analysis	3
Regional Development	9	Tourism	3

Table 14: Most Frequently used Words in Theses Title

Word in Thesis Title	n	Word in Thesis Title	n
Cluster/Clustering	143	Development	11
Industry / Industrial	47	Performance	10
Case	24	Strategy	9
Competitive (ness)	24	Textile	8
Turkey / Turkish	23	Advantage	7
Sector (al)	22	Economy / Economic	7
Region (al)	18	Ankara	7
Model	16	Antalya	7
Tourism	15	Proposal	7
SME(a)	11	Potential	7

The most commonly used words in the titles of graduate theses have been analyzed and the most used 20 words in the postgraduate theses title are given in Table 14. Conjunctions, prepositions, etc. words are excluded from the analysis. The words *"analyzing", "application", "approach", "study", "determination"* and *"effect"* have been repeated a lot, but they have been removed from the analysis because they are complementary. The most common words in the title which have been used in postgraduate theses are *"cluster/clustering", "industry/industrial", "case"* and *competitive/ness.*

It seems that the words industrial cluster / clustering and competition are mostly used in both the titles and the keywords of the theses. Since this research was conducted by including the words cluster and cluster in the title of the thesis, it is a possible result that the most repeated word is cluster / clustering. Many studies evaluate the concept of clustering and competition together. This is linked to competitive advantage, which is the ultimate goal of the cluster.

DISCUSSION

In literature, it has been reached a study about postgraduate theses on industrial clustering (Saatçi and Yalçınkaya, 2019). They evaluated 66 theses between 2006 and 2017 with regards to years, type, university, institute, department, subject, keywords, research type, language, academic titles of advisors and average page range. This study, unlike Saatci and Yalçınkaya (2019)'s study, also analyzes the following bibliometric parameters: theoretical foundation, data collection tool, sampling by sector and province, research method and most frequently used words in theses title. Saatçi and Yalçınkaya analyzed the accessibility status of keywords differently from this study. Different from Saatçi and Yalçınkaya (2019)'s study, language, year, university, institute, department, the title of advisors, numbers of page, subjects, theoretical background, research type and data collection tool have been evaluated according to the distribution of master's degree and doctorate theses. Thus, the differences between degrees could also be analyzed.

This study covers postgraduate theses including the word *"clustering"* and *"cluster"* between 2004 and 2020. So that this study's sample is expanded to 121 postgraduate theses. Saatci and Yalcınkaya (2019) collected postgraduate theses inclusion the word *"clustering"* in their name from the database of the Directorate of Council of Higher Education. They excluded studies which not related to industrial clustering similar to this study. Findings of bibliometric parameters as language, the year with the most theses published, institute, department, subject, the title of advisors, research type and keyword are similar to Saatçi and Yalçınkaya (2019)'s study.

This study has found that master theses are written more than doctorate theses related to industrial clustering in Turkey different findings to Saatçi and Yalçınkaya (2019). It is seen that Istanbul Technical University (10 theses, 8.26) has the highest number of graduate thesis studies among universities but the previous study which by Saatçi and Yalçınkaya (2019), the university with most theses written was Süleyman Demirel University. According to this study, the issue has been studied in 54 different universities, 11 different institutes and 35 different departments. In Saatçi and Yalçınkaya (2019)'s study, clustering within the scope of regional development was written covering 36 universities, six institutes and 18 departments.

Temel (2017) evaluated 35 postgraduate theses related to industrial clustering. The three postgraduate theses mentioned in the study should be excluded because they are studies on mathematical clustering, which is a research method. 32 theses related to industrial clustering are also examined within the scope of our study. According to Temel (2017) study, 63% of these are doctoral theses and 37% are master theses. In our study examining 121 theses, 52.07% master's theses and 47.93% doctorate theses are found. While in Temel's study only the theses affiliated to Social Sciences Institute and Natural and Applied Sciences institutes are examined, in our study the theses affiliated to 11 different institutes are examined. In our study, similar to Temel (2017)'s study, most of the theses are written under the Social Sciences institute. In this study, the postgraduate theses are generally textile (8.08%), tourism (7.3%), furniture (5.88%), manufacturing (5.14%), automobile (4.4%) and agriculture (4.4%) sectors. Similar to this study, according to Temel (2017), when the subject headings of the researches are examined, it seems that there are researches on manufacturing, agriculture, service and medical sectors. According to Temel (2017) study, when clustering studies are examined in terms of sectoral details, it seems that there are studies covering textile, forest products, natural stone, marble, tourism, informatics, automotive, banking, medical industry, furniture, logistics, rubber, defense industry, software sectors similar to this study.

According to Arıcıoğlu et al. (2018), using the Higher Education Council Thesis Database (as of 05.03.2017) as a result of scanning with the word *"Cluster"*, 33 theses are examined in the execution of the study. The sample of our study is 121 postgraduate theses on clustering from the database of the Directorate of Council of Higher Education (YÖKTEZ) between 2004 and 2020. To make a classification according to the departments, Business Administration (60.6%), Economics (48.4%), City and Regional Planning (27.2%), Finance (0.06), Sociology, Agriculture, Industrial Engineering, Tourism departments is similar to this study. It is concluded that 121 theses examined in our study are written in 35 different departments. Department-related business (27.27%) ranks first in the distribution of graduate theses on industrial clustering. This is followed department-related city and regional planning ranks with 19% and department-related economics ranks with 18.18%. 0.09% of the postgraduate theses used interview as a data collection tool and 3.33% made use of secondary data. In our study, 18.6% of the postgraduate theses used interviews and 29.07% of them used secondary data as data collection tools. In Arıcıoğlu et al. (2018)'s study, it is seen that 18.2% of the theses use social network analysis as a research method, and 3.03% use the Location Quotient Analysis. In our study, it is seen that 3.82% use social network analysis and 4.97% use Location Quotient Analysis as a research method. The Porter Diamond Model has come to the fore in the studies similar to the our study.

According to Arıcıoğlu et al. (2018), another point that draws attention in the thesis studies on clustering in Turkey is that there are more clustering studies in certain provinces and regions, but there are no studies on some regions. For example, while six studies were conducted for Ankara, four for Istanbul, three for Konya and Antalya, two studies each for Aydın, Isparta and the Mediterranean Region draw attention. In our study, when the sample of the study is analyzed on the basis of provinces, it is seen that most of the studies are conducted in Istanbul (10.87%), Ankara (9.24%) and Antalya (7.07%).

16 postgraduate theses examined by Balcı and Giray (2018) were also examined within the scope of our study. Within the framework of Porter's Diamond Model, it is seen that the potential of existing clusters to be clusters is examined by revealing competitiveness and the current situation of an existing cluster is examined similar to this study.

CONCLUSION

In this study, 121 postgraduate theses on industrial clustering published in the National Theses Center (YÖKTEZ) database between 2004 and 2020 have been evaluated within the framework of various parameters with their theories for development of discipline. By revealing the general trends, fields and topics in the postgraduate theses written on industrial clustering, it has been tried to guide about further research and most mention subjects to the researchers who will work in this field. The research data were analyzed using the bibliometric analysis method. Degree of postgraduate theses, distribution of master's degree and doctorate theses by language, years, universities, institutes, departments, title of advisors, number of pages, subjects, research type and data collection tools, distribution of sampling by sector and province, research method, most frequent keywords and most frequent words in the title of theses have been examined in terms of fifteen different bibliometric parameters.

When the degree of theses is examined, it is possible to see a balanced distribution. Clustering has been a remarkable topic for both degrees and has been studied. When the theses are examined in terms of the language in which they are written, it is seen that the theses are generally written in Turkish. It can be said that the concept of clustering has started to be evaluated more in postgraduate thesis studies, especially after 2015. Considering the distribution according to the universities, institutes and departments, some important findings are reached by the multidisciplinary structure of industrial clustering. Clustering is a popular topic. Theses on clustering have been published in institutes and universities affiliated with many

departments. This issue has been studied in 54 different universities, 11 different institutes and 35 different departments. Industrial clustering theses often analyze cluster or cluster potential in a particular sector or city. Multiple methods are used in postgraduate theses related to industrial clustering. Generally, descriptive and statistical analysis have been used as the research methods in postgraduate theses on industrial clustering. Cluster-specific methods is also frequently used as research methods.

The most common keywords used in postgraduate theses are "*clustering", "cluster", "competition"* and *"innovation"*. The most common words in the title which have been used in postgraduate theses are *"cluster/clustering", "industry/industrial", "case"* and *competitive/ness*. Clusters play an important role in competition and provide significant consequences for businesses, governments, universities, and other institutions in an economy. The competitive advantage provided by the cluster attracts the attention of the sectors and paves the way for clusters. In parallel with this interest in the sector, the interest of the subject in the scientific field is gradually increasing and the concept of clustering is gaining intense in postgraduate theses.

Strength, Limitations and Recommendations of the Study

The strength of this study is that postgraduate theses on the subject of industrial clustering have been examined in a wider range. In the study, it was examined in terms of many bibliometric parameters, "the theoretical foundation", which was not encountered in previous theses, was also examined. While the theses were been searched, more detailed words were inclusion and their connection with the individual topic was examined. This study has been prepared as a guide of researchers in future studies for a wide range.

It is a limitation of this study that the postgraduate theses examined in the study are only theses registered in the National Theses Center (YÖKTEZ) database and therefore the theses that have not yet been entered in the database are out of scope. Within the scope of the study, only postgraduate theses in the last 17 years are evaluated. There may be other theses published between the relevant years but could not be reached within the scope of this study.

For further research, bibliometric parameters can be diversified and increased. Comparative analyzes can be made by examining the theses written about clustering in various countries. Bibliometric analysis of the articles published in national and international journals and, the papers published in congresses and studies related to clustering can be evaluated and analyzed comparatively with theses.

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