

BIBLIOMETRIC ANALYSIS OF ENTREPRENEURIAL PERSONALITY WITH SCIENCE MAPPING TECHNIQUE



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Abstract

It is seen that the importance of entrepreneurship at regional and global levels is increasing day by day. The roles of entrepreneurs in this increase are pretty remarkable. Many studies have been conducted to understand entrepreneurs' roles better and reveal the factors that push individuals toward entrepreneurship in a better way. Some of these researches are shaped around the concept of entrepreneurial personality. It is seen that this concept, which includes both entrepreneurship and personality, is examined in a multidisciplinary manner. A bibliometric analysis was conducted to examine how studies on entrepreneurial personality have been handled from past to present and other characteristics. The Web of Science database encountered 169 studies on entrepreneurial personality between 1977 and 2023. VOSviewer program was used to visualize these studies with scientific mapping techniques. In addition, the MaxQDA program was used for additional analysis.

As a result, it is seen that studies on entrepreneurial personality are shaped around different countries and different author groups. In addition, it has been concluded that academic interest in entrepreneurial personality has increased, and this increase will continue. It is thought that studies on entrepreneurial personality are effective in explaining a structure that expands from the individual to society and economy.

1. Introduction

It is seen that the importance of entrepreneurship and, therefore, the number of entrepreneurs is increasing daily. It is stated that entrepreneurs have and will continue to have a say in many local and global areas. In the Sustainable Development Goals of the United Nations, strong emphasis is placed on entrepreneurs, especially innovative ones (Akkuş & Çalıyurt, 2022). The 21st century is predicted to be the century of entrepreneurs, marked by creative entrepreneurs (Kuratko & Hodgetts, 1998). The motivations, individual characteristics, and personalities of entrepreneurs, who are so influential locally and globally, attract the attention of researchers (Segal et al., 2023).

It is seen that many different paths have been followed in examining the individual characteristics and personality traits of entrepreneurs. Some researchers prefer to define the entrepreneur within this framework by focusing on personality traits such as the big five, frequently used in psychology. It can be said that there is an emphasis on the differentiation of entrepreneurs'

general personality traits from other individuals (Manolopoulos et al., 2022; Prieto-Diez et al., 2022; Xiao et al., 2022). Some researchers focus on variables that define entrepreneurs and are more specific to entrepreneurs. Examples of these variables are innovation (Nguyen et al., 2023), entrepreneurial tendencies (Bashir & Saqib, 2023; Maaravi et al., 2022), and entrepreneurial intentions (Fawaid et al., 2022).

In contrast to the ways listed above, a different way defines the entrepreneur on their unique personality structure (Staniewski et al., 2016). At this point, the concept of entrepreneurial personality emerges, which focuses on the entrepreneur and examines their personality and personal characteristics in this context (Miller, 2015). It is reported that research focusing on the entrepreneur's personality has increased rapidly in recent years (Chandra, 2018). It is even claimed that developing a current theory based on entrepreneurial activities is difficult without focusing on personality variables (Rauch & Frese, 2007).

In light of all these evaluations, it is thought that analyzing the historical development and current status of research on entrepreneurial personality from past to present will guide new researchers. For this purpose, research was designed to analyze the studies on entrepreneurial personality in the Web of Science database.

2. Literature Review

One of the basic concepts of the research is the entrepreneur or entrepreneurship. Various changes have been observed in the meanings attributed to the entrepreneur since its first definition. In the 18th century, the entrepreneur was defined as a craftsman or merchant who takes the product he produces or buys to the market to sell it at prices that have not yet been determined (Cantillon, 2010). In the 19th century, the concept of risk-taker was added (Say, 1971). In the same century, the concepts of entrepreneurship and disruptive creativity started to be mentioned together. It is becoming increasingly difficult to think of the entrepreneur and entrepreneurship separately from the idea of innovation (Schumpeter, 2000).

Another fundamental concept in the research is personality. It would be appropriate to say that the development of the concept of personality accelerated with the emergence of psychology as a science. It is seen that the details of the concept of personality, which is defined as the sum of consistent behavior patterns arising from the individual and the internal processes of personality experienced by the individual, differ according to each psychological approach (Burger, 2019). In psychology, it is seen that there are different perspectives in both defining and measuring personality. While some approaches claim that personality can be measured with qualitative measures and classified as personality types, others argue that it can be measured quantitatively through traits. In addition, there are also approaches that state that personality can be measured quantitatively through not so many factors (Cloninger, 2004). Generally, it would be appropriate to say that each psychological theory has a personalized approach specific to its perspective. At this point, Psychodynamic Theories led by Sigmund Freud and Alfred Adler, Humanistic Theories led by Abraham Maslow and Carl Rogers, Distinctive Trait Theories led by Gordon Allport and Raymond B. Cattell, and Learning Theories led by B. Frederick Skinner and Albert Bandura are stated to be the four main theories that define personality (Feist et al., 2018).

Entrepreneurial personality emerges with the combination of the entrepreneur and personality concepts discussed separately above. Entrepreneurial personality refers to a typology rather than a specific representative or individual. Entrepreneurial personality is expressed as a category of a function within the

socio-economy as a social structure. It is expected to observe particular behavior patterns in individuals with entrepreneurial personalities. These individuals tend to adopt entrepreneurship as a way of life. However, it is stated that this adoption is conscious and occurs mainly through cognitive processes (Chell, 2008). At this point, it is stated that entrepreneurial personality is not independent of other personality traits. It is indicated that many factors associated with entrepreneurship, such as innovation, locus of control, achievement motivation, stress tolerance, and risk-taking, are related to entrepreneurial personality (Postigo et al., 2021; Staniewski et al., 2016). It is also stated that the big five traits frequently used in explaining character are related to entrepreneurial personality (Leutner et al., 2014; Obschonka et al., 2014; Sahinidis et al., 2019).

3. Research Methodology

This study examined prominent studies on "entrepreneurial personality" through bibliometric analysis. The findings obtained were described with a visual mapping technique. The bibliometric analysis technique can contribute to the literature by revealing the developments, current changes, and focus points in the field of study (Martínez et al., 2015). In addition, it is reported that bibliometric research can establish objective criteria in the field of study, evaluate scientific productivity, and reveal additional aspects that need to be investigated (Andrés, 2009).

The Science Mapping technique is one of the current techniques used in bibliometric analysis. This technique processes the data obtained and evaluated with various visual analytical tools. After these processes, patterns, trends, and changes in scientific data and theories can be visualized and presented (Chen, 2017). The first step in the Science Mapping technique is to determine the source from which scientific data will be obtained and to retrieve the data. After the data is pre-processed, relationship networks are revealed. The data subjected to normalization are analyzed by mapping and visualized in the final stage (Martínez et al., 2015).

To obtain data on bibliometric analysis, the concept of "Entrepreneurial Personality" was searched in all indexes in the Web of Science database on 03.05.2023. One hundred sixty-nine scientific publications distributed between 1977 and 2023 were obtained. To carry out the other stages of the research, the data were uploaded to the VOSviewer program, and mapping was carried out using this program. VOSviewer is considered one of the leading open-source programs developed to create and visualize mappings of network data (Van Eck & Waltman, 2013). It can be said that the VOSviewer program was chosen because its visuals are more effective compared to other programs that perform similar analyses. The MaxQDA program used in the qualitative research was preferred in some tables presented in the

findings and the word cloud creation. The MaxQDA program is effective in both content analysis of bibliometric data and visualization of qualitative conclusions (Kuckartz & Rädiker, 2019; Oliveira et al., 2013; Sajdera, 2023; Woolf & Silver, 2018).

4. Presentation of Results

It is seen that there are 169 scientific publications on Entrepreneurial Personality in the Web of Science database. It was determined that 122 of these publications, i.e., 72%, consisted of articles. When 11 early access articles are added to these, the rate rises above 78%. Conference presentations constitute 34 of the studies, i.e., 20%. It is seen that the other studies belong to different genres, especially book chapters.

When the years of the studies are analyzed, it is observed that the first study was published in 1977. On 03.05.2023, when the data were obtained, it was seen that the number of studies in 2023 was 6. Table 1 showing the years and numbers of the studies is presented below.

Table 1. Distribution of publications on Entrepreneurial Personality by years

Year of Publication	Number of Publications	Percentage of Publication (%)
2023	6	3,550
2022	18	10,650
2021	23	13,609
2020	7	4,142
2019	13	7,692
2018	13	7,692
2017	11	6,509
2016	8	4,734
2015	13	7,692
2014	9	5,325
2013	7	4,142
2012	8	4,734
2011	8	4,734
2010	3	1,775
2009	4	2,367
2008	3	1,775
2007	1	0,592
2006	2	1,183
2004	1	0,592
2003	2	1,183
2002	1	0,592
2001	1	0,592
2000	1	0,592
1998	1	0,592
1997	1	0,592

1996	1	0,592
1993	1	0,592
1992	1	0,592
1977	1	0,592
Total	169	100

Among the reviewed studies, it is seen that the first article published by De Vries (1977) on entrepreneurial personality deals with empirical studies on entrepreneurial behavior and entrepreneurship and examines the social, economic, and psychological factors affecting entrepreneurial personality. In addition, it can be evaluated that this study took the first step in conceptualizing entrepreneurial personality. After about 25 years of silence on entrepreneurial personality, it is understood that the subject started to attract attention again in the 90s. This interest showed a slow increase until 2010, but after 2010, it caught a serious upward momentum.

When the fields of study are examined, it can be mentioned that there is a distribution to various areas, although there is a concentration in some fields. The distribution of studies on entrepreneurial personality according to their fields is shown in Table 2.

Table 2. Distribution of Entrepreneurial Personality studies according to fields

Field of Study (Web of Science Categories)	Number of Publications	Percentage of Publication (%)
Business	65	38.462
Management	51	30.178
Psychology Multidisciplinary	26	15.385
Economics	19	11.243
Education Educational Research	11	6.509
Psychology Social	10	5.917
Social Sciences Interdisciplinary	9	5.325
Psychology Applied	8	4.734
Multidisciplinary Sciences	6	3.550
Environmental Studies	5	2.959
Regional Urban Planning	4	2.367
Sociology	4	2.367
Geography	3	1.775
Agriculture Multidisciplinary	2	1.183

Engineering Electrical Electronic	2	1.183
Environmental Sciences	2	1.183
Green Sustainable Science Technology	2	1.183
Psychology Clinical	2	1.183
Social Work	2	1.183
Women Studies	2	1.183

Table 2 lists the areas with at least two studies. It should be taken into consideration that some studies may be included in two or more fields at the same time. In addition, since the fields with one study are not listed, the sum of the columns in the table should not be expected to give the total number of studies. When the main fields of Entrepreneurial Personality studies are examined, it is seen that the weight is in the fields of Business Administration and Management (68.64% in total). Apart from this, there is also a significant distribution (27.21%) in the fields of multidisciplinary psychology, social psychology, applied psychology, and clinical psychology, which are considered among the sub-branches of psychology.

Table 3. Distribution of Entrepreneurial Personality Studies by Country

Country	Number of Publications	Percentage of Publication (%)
USA	26	15.385
Germany	24	14.201
England	17	10.059
Peoples R Chine	16	9.467
Australia	15	8.876
Spain	13	7.692
Romania	9	5.325
Malaysia	8	4.734
Turkey	8	4.734
France	7	4.142

The country distribution of publications on Entrepreneurial Personality scanned in the Web of Science is presented in Table 3. However, considering that it is not necessary to list all countries, only the data of the top ten countries with the highest number of publications are shared. Accordingly, it is seen that the USA and Germany have a high rate of publications, which distinguishes them from other countries. It can be said that countries with more than ten publications are behind the leading countries as a group. Countries with fewer than ten publications can be considered as a third group following the leading countries. A mapping analysis was performed on the research data with the VOSviewer program, where the analysis type is co-authorship, and the unit of analysis is countries. The results are presented in Figure 1.

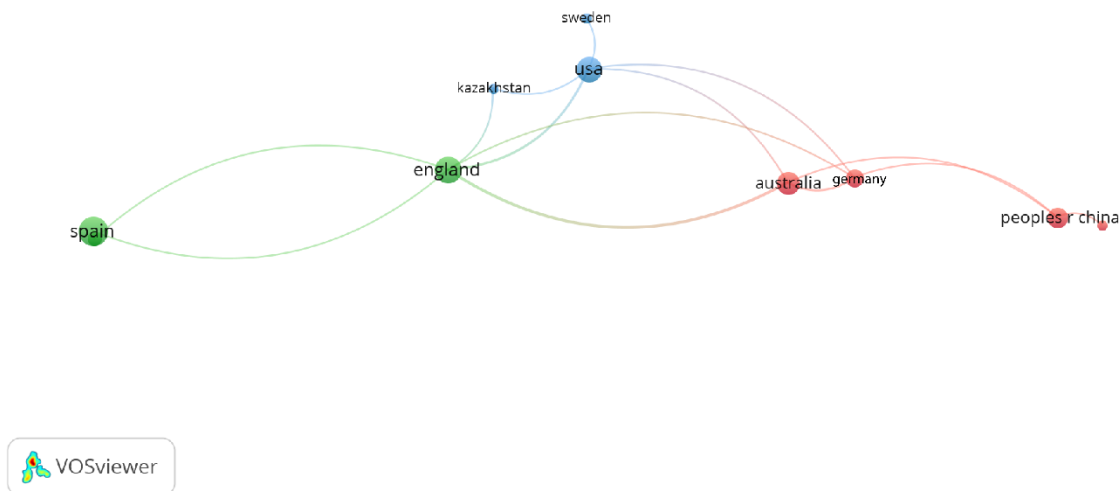


Figure 1. Mapping of Entrepreneurial Personality publications based on country data and co-authorship

When the findings in Figure 1 are evaluated, it is seen that the USA, which ranks first in several publications, and the UK, which ranks third, have many links in co-authorship. It can be interpreted that Germany, which ranks second in publications, is relatively behind in co-authorship. Co-authorships of Spain, Australia, and China are parallel with the number of publications. On the other hand, it is pretty remarkable that Kazakhstan and

Sweden, which have no more than two publications, are included in the analysis with co-authorship.

Another analysis was conducted on countries and citations. A mapping was made on the program where the type of analysis was citation, and the unit of analysis was countries. This map and the results of the analysis are presented in Figure 2.

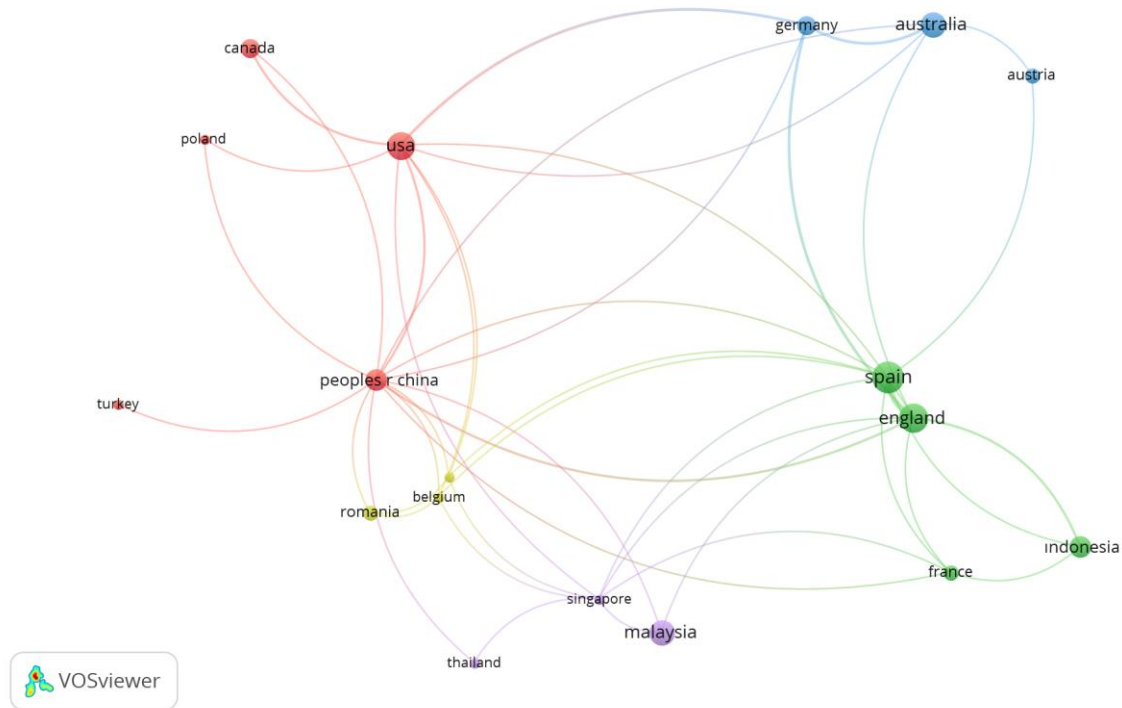


Figure 2. Mapping of Entrepreneurial Personality publications based on country data and attribution

When the map above is evaluated, it can be assessed that Spain, China, and the USA are the center countries regarding citations. It can be said that the UK, Germany, and Australia are also on the way to becoming a center country. The fact that Singapore, which has relatively few publications, has a strong network in terms of citation relations reveals a situation that requires in-depth analysis.

Another title that should be examined in publications on entrepreneurial personality is the authors. In this regard, the number of publications of authors with publications in the Web of Science database and their percentages in the total number of publications were analyzed. The findings are presented in Table 4.

Table 4. Distribution of Entrepreneurial Personality Studies by Authors

Author's Surname and First Letter of First Name	Number of Publications	Percentage of Publication (%)
Obschonka M	14	8.284
Cuesta M	9	5.325
Garcia-cueto E	7	4.142
Muniz J	7	4.142
Postigo A	7	4.142
Schmitt-rodermund E	6	3.550
Prieto-diez F	4	2.367
Stuetzer M	4	2.367
Cazan AM	3	1.775
Fritsch M	3	1.775
Gosling SD	3	1.775
Lozano LM	3	1.775
Luca MR	3	1.775

Mutohhari F	3	1.775
Nurtanto M	3	1.775
Potter J	3	1.775
Silbereisen RK	3	1.775
Suarez-alvarez J	3	1.775
Wyrwich M	3	1.775
Ahmetoglu G	2	1.183
Breitenecker RJ	2	1.183
Chamorro-premuzic T	2	1.183

Chell E	2	1.183
Dada O	2	1.183
Erlykova JN	2	1.183

Only the authors among the top 25 regarding the number of publications are included above. A total of 372 authors were included in 169 studies. Another analysis was conducted on authors and co-authorship. The findings of the mapping where the type of analysis is co-authorship and the unit of analysis is authors are presented in Figure 3.

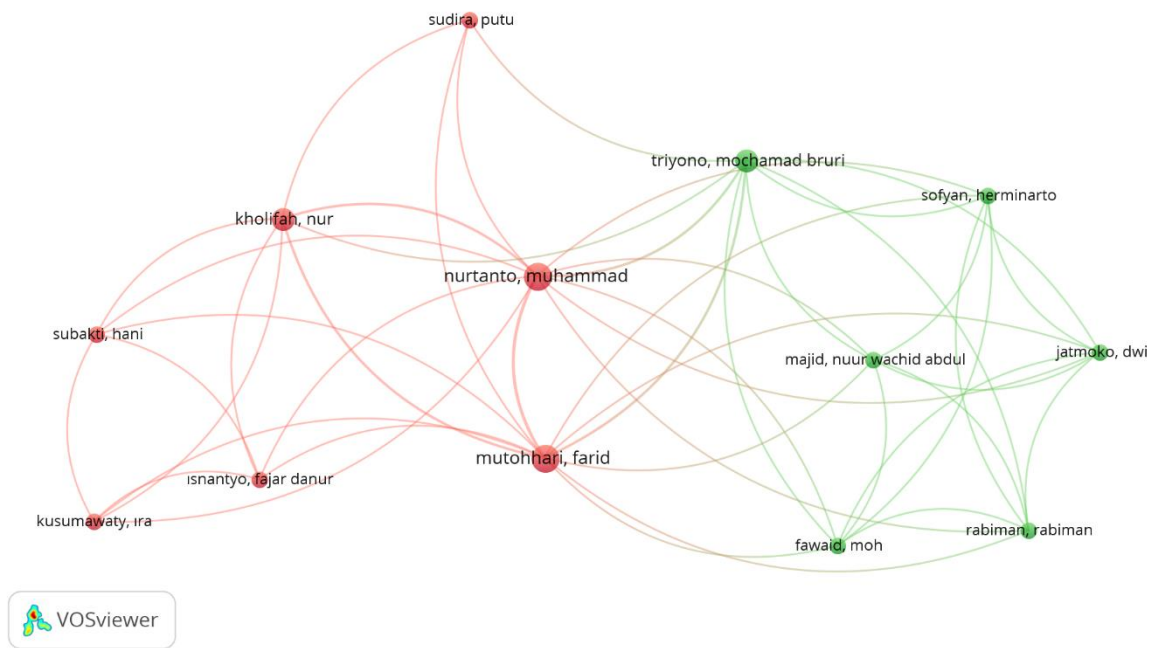


Figure 3. Mapping of Entrepreneurial Personality publications based on author and co-authorship

In terms of co-authorship, it can be said that three authors stand out. These authors are listed as Nurtanto, Mutohhari, and Triyono. It is noticeable that these three authors have many publications with each other and different authors. Although these authors' publications are relatively low, it would be appropriate to say that they form an effective working group regarding co-authorship.

On the other hand, the fact that authors such as Obschonka M and Cuesta M, who have a high number of publications, are not included in the analysis of co-authorship is an issue that needs to be addressed separately. Another evaluation was made based on the authors and their citations. The mapping for this is presented in Figure 4.



Figure 4. Mapping of Entrepreneurial Personality publications by author and citation

When the figure above is evaluated, it is observed that the authors named Obschonka and Cuesta, who have many publications, also have many citations. However, it was interesting that the authors Mutohhari, Chartrungruang, and Awruk, who have relatively few

publications, were included in the citation analysis. For more detailed analysis, bibliometric coupling mapping was also performed on the authors and is presented in Figure 5.



schwab, aj



Figure 5. Mapping of Entrepreneurial Personality publications by author and bibliometric matching

The figure above shows a large group on one side and a relatively smaller group of authors on the other. It can be said that the large group in which the author Cuesta is at the center has similar citation matches. In the small group led by the author named

Muthhari, it can be said that the citation matches differ and tend to be more in-group. When a mapping was performed on the cited studies, the mists presented in Figure 6 were obtained.

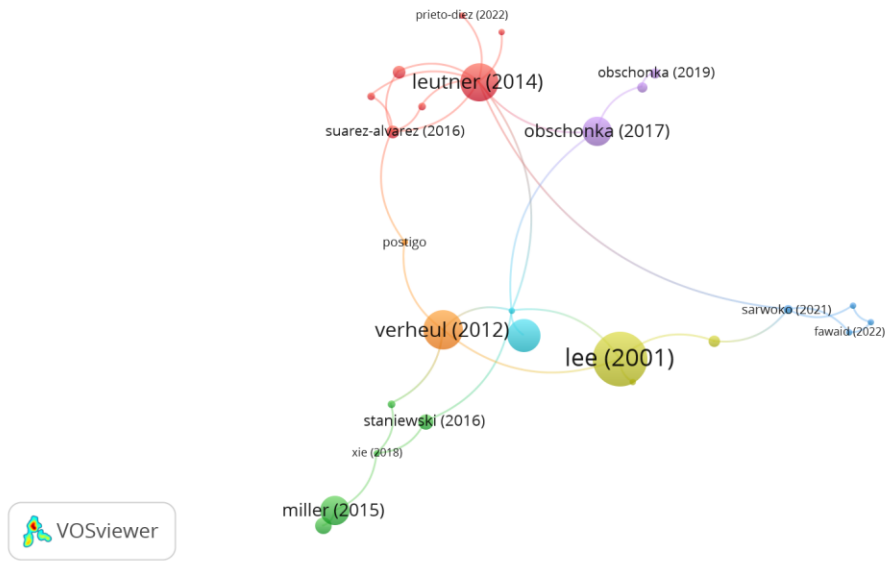


Figure 6. Mapping of Entrepreneurial Personality publications based on citations and cited studies

When the findings above are evaluated, it is seen that Lee and Tsang (2001) study, published relatively earlier, stands out more in terms of citation. On the other hand, the studies of Verheul et al. (2012) and Leutner et al. (2014) are also well-cited. In addition, it can be seen that studies published relatively recently, in which Obschonka is the author, are also strongly included in the citation analysis (Obschonka & Stuetzer, 2017; Obschonka et al., 2019).

Another analysis was conducted on keywords in the analyzed studies. At this point, instead of listing all keywords in the studies, keywords with a frequency of five or more were included in the list. The MaxQDA program was used to determine the frequencies of keywords.

Table 5. Frequencies of Keywords in Entrepreneurial Personality Studies

Keyword	Frequency	Percentage
Entrepreneurship	50	29,59
Entrepreneurial Personality	44	26,04
Personality	30	17,75
performance	29	17,16
Big Five	24	14,20
traits	20	11,83
self-efficacy	20	11,83
behavior	15	8,88
dimensions	14	8,28
innovation	13	7,69
model	13	7,69
education	12	7,10
Entrepreneurial	12	7,10
business	11	6,51
orientation	11	6,51
culture	9	5,33
metaanalysis	8	4,73
gender	8	4,73

Entrepreneurial intention	8	4,73
self-employment	8	4,73
psychology	8	4,73
entrepreneurs	8	4,73
Personality traits	8	4,73
entrepreneurial orientation	7	4,14
motivation	7	4,14
intention	7	4,14
growth	7	4,14
students	7	4,14
Narcissism	6	3,55
persistence	6	3,55
achievement-motivation	6	3,55
managers	6	3,55
entrepreneurial intentions	6	3,55
intentions	6	3,55
entrepreneurial personality traits	6	3,55
ambiguity	6	3,55
China	6	3,55
creation	5	2,96
impact	5	2,96
start-ups	5	2,96
emergence	5	2,96
creativity	5	2,96
SMEs	5	2,96
risk-taking	5	2,96
job-performance	5	2,96
Enterprising Personality	5	2,96
knowledge	5	2,96
5-factor model	5	2,96
Entrepreneurship Education	5	2,96

When the above table is evaluated, it is seen that entrepreneurship, entrepreneurial personality, and personality concepts are in the first place, as expected. In addition, it is noteworthy that performance and Big Five personality traits are frequently used as keywords in the studies. In addition, it can be

determined that other characteristics related to the entrepreneur's personality are frequently included in the keywords.

A mapping analysis was performed to evaluate the relationship between keywords. The findings of this analysis are presented in Figure 7.

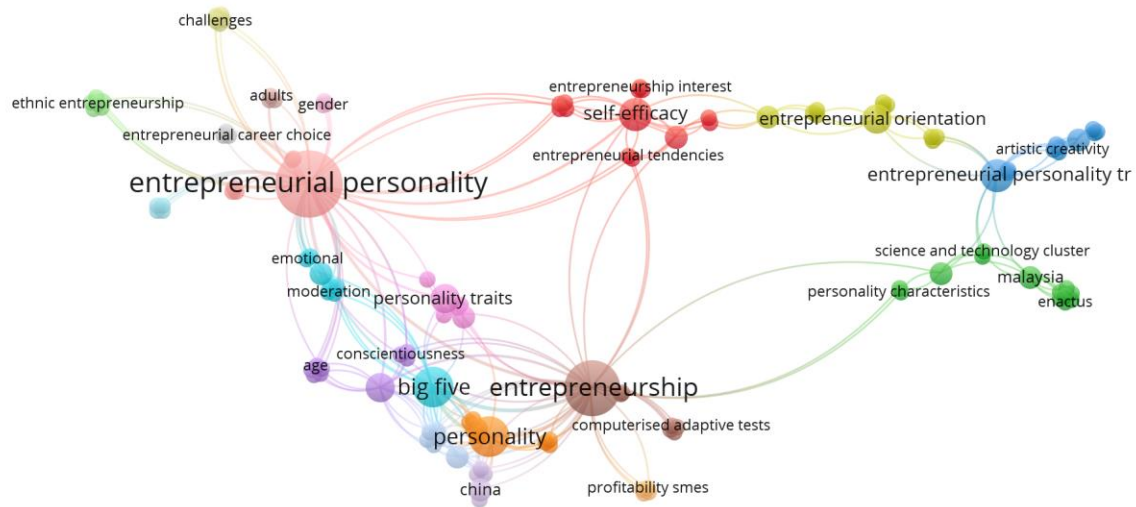


Figure 7. Relationships of keywords in Entrepreneurial Personality publications

When the figure above is analyzed, it can be said that there are three different clusters. The most intense clustering is naturally around entrepreneurial personality. It can be said that there are more keywords related to demographic variables around entrepreneurial personality. The second cluster is formed around the keyword's entrepreneurship and personality. Around this cluster, it is seen that there are dimensions related to personality. It is seen that keywords such as emotional, moderation, big five, and personality traits are between the two clusters described above and in relation to both clusters. The third cluster is more disorganized than the other two clusters. It is thought that making

a clear inference from this clustered structure that develops around keywords such as self-efficacy, entrepreneurial orientation, and personality characteristics will be challenging.

Finally, the findings section includes the word cloud in which all bibliometric data on entrepreneurial personality are analyzed. This word cloud in Figure 8 was created in the MaxQDA program with a limit of 100 words. While creating the word cloud, conjunctions, numbers, and expressions containing numbers were excluded.

entrepreneurial personality and the fact that they have worked with different groups on the subject. Although the number of publications is low, it is thought that it would be appropriate to conduct additional studies on authors with high citations. Three studies stand out when the citations are explicitly evaluated for the study. These studies are Lee and Tsang (2001); Leutner et al. (2014); Verheul et al. (2012).

When the studies are evaluated in terms of keywords, it is seen that the concepts of entrepreneurial personality, entrepreneurship, and personality are frequently used as expected. In addition, it is noteworthy that other variables related to entrepreneurship are also included in the keywords. Another group that draws attention to keywords consists of personality and personality measurement variables.

As a result, it is seen that research on entrepreneurial personality has increased considerably day by day, and this increase is expected to continue. Although it is observed that studies are concentrated in certain countries or specific regions, it is possible to encounter publications from many different parts of the world. This can be seen as a sign that the literature on the subject is fed by other sources and different perspectives rather than a single source or paradigm. A similar situation was encountered in analyzing the distribution of authors and citations across authors. It can be said that studies and citations are shaped around various author clusters.

As a result of the studies' keyword and word cloud analysis, it can be concluded that entrepreneurial personality is evaluated from the perspective of both business and management and psychological science. Entrepreneurial personality has been examined both in terms of the development and success of the enterprise and on the personality at the individual level. From this point of view, it would be appropriate to say that entrepreneurial personality is examined in a structure that expands from the individual to society and economy and from society and economy to development. For this reason, it is thought that the increase in studies on entrepreneurial personality will play an explanatory role in ensuring sustainable entrepreneurship and sustainable development.

In future studies, it is suggested to reveal unexplained deviations with the mapping technique. It is also recommended to conduct bibliometric analyses and meta-analyses in which entrepreneurial personality is examined together with other dimensions with which it is in contact.

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APPENDIX

Appendix 1 Frequency of Institutions in Entrepreneurial Personality Studies (Top 25)

Institution	Frequency	Percentage
FRIEDRICH SCHILLER UNIVERSITY OF JENA	13	7.514
UNIVERSITY OF OVIEDO	12	6.936
QUEENSLAND UNIVERSITY OF TECHNOLOGY QUT	7	4.046
UNIVERSITY OF TEXAS SYSTEM	6	3.468
SAARLAND UNIVERSITY	4	2.312
UNIVERSIDAD ANTONIO DE NEBRIJA	4	2.312
UNIVERSITY OF TEXAS AUSTIN	4	2.312
ATOF INC	3	1.734
EGYPTIAN KNOWLEDGE BANK EKB	3	1.734
GEORGE EMIL PALADE UNIVERSITY OF MEDICINE PHARMACY SCIENCE TECHNOLOGY OF TARGU MURES	3	1.734
JAMES COOK UNIVERSITY	3	1.734
TECHNISCHE UNIVERSITAT ILMENAU	3	1.734
TOMSK STATE UNIVERSITY	3	1.734
TRANSYLVANIA UNIVERSITY OF BRASOV	3	1.734
UNIVERSITAS NEGERI YOGYAKARTA	3	1.734
UNIVERSITAS SULTAN AGENG TIRTAYASA	3	1.734
UNIVERSITI TEKNOLOGI MARA	3	1.734
UNIVERSITY OF GRANADA	3	1.734
UNIVERSITY OF LONDON	3	1.734
ARQUS	2	1.156
BADEN WURTTENBERG COOPERAT STATE UNIV	2	1.156
CHINESE UNIVERSITY OF HONG KONG	2	1.156
CIBER CENTRO DE INVESTIGACION BIOMEDICA EN RED	2	1.156
CIBERSAM	2	1.156
HONG KONG POLYTECHNIC UNIVERSITY	2	1.156

Appendix 2 Frequency of Publishers in Entrepreneurial Personality Studies (Top 25)

Publishers	Frequency	Percentage
Elsevier	23	13.295
Emerald Group Publishing	22	12.717
Springer Nature	16	9.249
Taylor & Francis	10	5.780
Frontiers Media Sa	9	5.202
Sage	9	5.202
Acad Conferences Ltd	7	4.046
Wiley	6	3.468
Walter De Gruyter	5	2.890
Mdpi	3	1.734
Penerbit Uthm	3	1.734
Amer Scientific Publishers	2	1.156
Colegio Oficial De Psicologos De Asturias	2	1.156
Euromed Press	2	1.156
Foundation Advancement Psychology	2	1.156
IEEE	2	1.156

LATVIA UNIV AGRICULTURE	2	1.156
Now Publishers Inc	2	1.156
Oeconomica Publishing House	2	1.156
Public Library Science	2	1.156
Russian Acad Sciences, State Acad Univ Humanities (GAUGN)	2	1.156
Soc Personality Res Inc	2	1.156
Tomsk State Univ	2	1.156
Amer Psychological Assoc	1	0.578
Ani Yayincilik	1	0.578