Bibliometrical analysis of postgraduate theses on sustainable development in Turkey

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Abstract: Sustainability has recently been among the frequently repeated concepts upon recognition especially of value of nature and natural resources. Substantial studies have been conducted on the subjects related with sustainability after 1980s. Increasing interest in sustainability concept has also enhanced point of view from every angle. The preliminary studies on the subject were mostly on comprehension of environmental sustainability. Over the time, sustainability has become privileged research domain in every angle from economy to health, from agriculture to management and so on. In Turkey, there have been various researches on sustainability and postgraduate level theses have been published. The objective of the present study is to analyze postgraduate theses on “sustainable development” in Turkey. Thus, it was aimed to determine which dimensions and which angles of sustainable development have been covered so far in Turkey. In this scope, postgraduate theses located in the database of the Higher Education Board National Thesis Center (YÖKTEZ) were screened through a literature search; then, collected data was classified through content analysis; and finally, bibliometric analysis was conducted. Totally 250 postgraduate theses on sustainable development published in the period of 1992-2021 were collected. The bibliometric analysis was conducted on collected theses with respect to their type, publishing year, language, distribution according to university and institute, titles of thesis advisor, number of pages, references, keywords, research method and data collection method. As a result of our analysis, it was determined that theses on sustainable development were oriented on environment, environmental issues, environmental sustainability, climate change, sustainable development education, renewable energy and sustainable economy subjects. Moreover, theses were predominantly master theses and issued by students registered with postgraduate programs of Social Science Institute. Although number of theses has varied over the time, it increased significantly recently. It was also determined that they were suffering major deficiencies with research method and data collection methods.

1. Introduction

In order to reach better understanding of sustainable development concept, sustainability concept needs to be investigated at first. The reason for this was that sustainable development subject was born from the sustainability concept (Dixon and Fallon, 1989). There are numbers of descriptions drawn on sustainability concept. Consideration of the subject in different domains has resulted in interpretation of concepts from their unique specialization. Diversification of these interpretations has sometimes ended up with polysysemy and sometime conceptual uncertainty (Salas-Zapata and Ortiz-Muñoz, 2018). However, it is seen that descriptions suggested on the concept frequently included continuity and sustention (Miller, 2011; Jain et al., 2020; Corrales-Estrada et al., 2021). Within the scope of this information, sustainability concept means
something permanent, ensuring continuity, and allowing sustentation. It has also been observed that the concept of sustainability can have different meanings depending on the context in which it is used (Bezerra et al., 2021).

On the other hand, the concept of sustainable development is mostly associated with Dr. Gro Harlem Brundtland, former president of Norway, chairman of United Nations Environment and Development Commission rather than other descriptions because Brundtland (1987) made the description of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Scarlat and Petrisor, 2021). As it could be figured out from this description, possibility to satisfy the needs of future generations should become essential consideration of everyone consuming scarce resources. Sustainability principle should be fundamental principle in development while satisfying needs of contemporary and future need. The adoption of principles on development and sustainability is very important for future changes, focusing on attitudes and behaviors, and an integrated sustainability concept. The adoption of principles on development and sustainability is very important for future changes, focusing on attitudes and behaviors, and an integrated sustainability concept (Agirreazkuenaga, 2022). Raising awareness with this phenomenon allows more productive utility of scarce resources, differentiation of fight against scarcity, and bringing the concept of sustainable development to forefront in every domain (Robinson and Herbert, 2001; Omer, 2008; Zamora-Polo and Sanchez-Martin, 2019).

As it could be inferred from sustainability concept and accompanied sustainable development concept, these concepts cannot be associated with a single status or domain. Every field and sector should adopt the concept of sustainability as a basic principle. Sustainability needs to be investigated for the continuation of human life, the quality of life of future generations and especially for nature. When the literature review is examined, it is seen that studies are mostly focused on sustainable development education and sustainability education. The common points emphasized in these studies are schools’ primary position in relate with education of sustainability theme, deep information, sizable responsibility of local and central governments, necessity of raising consciousness of local residents, and especially giving sustainable development education to university students to motivate them to do research and studies on the subject (Barth et al., 2007; Rocha et al., 2007; Sahlberg and Oldroyd, 2010; Sinakou et al., 2018).

University education on sustainable development is suggested by the current literature and students are expected to conduct studies on this subject. This study is especially concentrated on theses published on sustainable development by postgraduate students. Issued postgraduate theses were analyzed based on various criterions and obtained results and data were exhibited through illustrations and graphs. The objective of the present study was to investigate how postgraduate students handle the sustainable development subject in their theses from various aspects and to draw suggestions for other students who are in pursuit of studying the same subject. Within the scope of our objectives, methodology and data of our study was presented in the “Materials and Methods” section at first. Our data was presented through illustrations and graphs. In the “Conclusions” section, obtained data from bibliometric analysis of postgraduate theses was assessed; possible contribution of this manuscript to the current literature was explained and suggestions were drawn for further studies of other researchers.

2. Materials

Our study aims to analyze totally 250 postgraduate theses published on sustainable development in Turkey the period of 1992-2021. As there was no restriction for any particular year, all accessed theses concerning sustainable development subject were included into our analysis. Postgraduate theses were accessed from the Higher Education
Board National Thesis Center (YÖKTEZ) Database. The objective of our study is to analysis how and at which extent the sustainable development subject is studied by postgraduate students in Turkey through their postgraduate theses; and to draw suggestions for other students who are in pursuit of studying this subject in the future.

Within the scope of our objectives, three different methods were utilized. First, postgraduate theses on sustainable development were collected through literature review method. Two-hundred and fifty theses gathered at the end of the literature review were analyzed by means of the content analysis method; and data on theses was collected. Finally, bibliometric analysis method was employed to decipher data acquired at the end the content analysis method and to infer meaningful results. Bibliometric analysis is a method to comprehend research tendency of academic publishing (e.g. article, presentation, book, thesis and etc.) in a certain domain or subject. In this analysis, the first step is front process and refinement of data (Moral-Muñoz et al., 2019; Alsharif et al., 2020). Bibliometric analysis makes contribution to studies with large-size data to refine, interpretation, exploration of intellectual structure within the specific boundary of a domain or subject in the literature, deciphering nuance of subjects upon which publications made intensively and mapping of data. Even though this analysis offers number of benefits, it has not been utilized frequently until recently with respect to other research methods (Donthu et al., 2021). Bibliometric analysis has gained immense popularity in research in the social sciences in recent years (Ho et al., 2021). Bibliometric analysis uses various parameters to investigate scientific studies. In this study, bibliometric analysis was utilized to investigate 250 postgraduate theses with 11 parameters: type of thesis, publication year, language, and distribution of theses according to university and institutes, title of thesis advisors, number of pages, number of references, keywords, research methods and data collection methods. A total of 250 theses were analyzed using a multi-stage process that included classification of data according to typologies, classification of the text of theses according to subject content, and figures and graphics used to present the data visually.

3. Results

In this section of the study, findings from the bibliometric analysis of the 250 postgraduate theses conducted in Turkey on sustainable development in the period of 1992-2021. Postgraduate theses were investigated and analyzed in 11 parameter categories. At the end of the analysis, meaningful data was visualized as below. Summarizing and classification of obtained finding after the analysis and presentation of data through illustrations and graphs constituted the significance of the present study in terms of classification motive of the science. First, distribution of type of theses published on sustainable development was exhibited.

Figure 1 exhibits distribution of type of postgraduate theses. It was seen that 81% of the 250 theses on sustainable development were master theses. Nineteen percent of theses (48) were doctorate level. Başgelen and Akkaş (2019), analyzed education researches conducted on sustainable development, reports that number of doctorate theses is less than others, which supports our finding. Due to the limited number of doctorate theses on sustainable development, doctorate level students are suggested study on this subject. The next figure summarizes the distribution of theses according to publication years.

Figure 2 above exhibits distribution of postgraduate theses on sustainable development according to their publication years. It was seen that the first thesis on the subject in Turkey was published in 1992. Hence, according to the distribution of 250 postgraduate theses on sustainable development published in the period of 1992-2021, it was seen that there was remarkable interest on the subject in 2019. Before 2019, interest in sustainable development has increased. In the past, the interest in the subject increased and theses started to be written. However, due to the length of the thesis writing period and publication period, these were published in 2019. Similar findings are
reported by the study of Yalçıntaş, Gülmez and Yaşar Özeltürkay (2021). Authors remark that "there is no study on the subject in 2009; the number of published theses increased gradually after 2011; and the highest number of thesis (42 theses) was published in 2019", which supports our analysis results presented above. The study of Yalçıntaş and colleagues are only about the theses on sustainability within the scope of business management. Therefore, they were not included the theses published in 2009. According to our analysis result, it was seen that there were 4 theses published in 2009. Thus, these findings suggested that 4 theses published in 2009 were in different subject other than business management. According to our analysis results, there were no any theses published on the subject in 1997 and 1999. Even though publication number varies in other years, it was seen that the interest in the sustainable development subject has prevailed. In the next figure, distribution of the theses was presented with respect to their languages.

![Figure 1. Distribution of Postgraduate Theses according to Their Types](image1)

![Figure 2. Distribution of Postgraduate Theses according to Publication Years](image2)

Figure 3 exhibits distribution of concerned postgraduate theses according to their publication language. It was seen that majority of theses on sustainable development were published in Turkey. Only 52 out of 250 theses were published in English. In consideration of minority of theses published in English, publication of future studies in English would enlighten global researchers about Turkey’s current status in sustainable development literature. Accordingly, it was suggested to conduct postgraduate theses in especially English and other popular foreign languages. In the next analysis, distribution of theses according to type of university was presented.
Figure 3. Distribution of Postgraduate Theses according to Their Language

The figure 4 above indicates that there were two different university types. In Turkey, university education is provided by either government or foundation universities. In terms of distribution of postgraduate theses on sustainable development according to university, it was seen that 96% of them were from government universities. Only 11 out of 250 theses were from foundation universities. The reason of this status was small population of foundation universities in Turkey and they were established in the recent history. In the following analysis, distribution of theses was exhibited according to institutes.

Figure 4. Distribution of Postgraduate Theses according to Type of Universities

Figure 5 exhibits distribution of postgraduate theses according to institutes. This distribution portrayed the science departments concentrated on sustainable development subject. According to the illustration, 177 theses out of 250 total theses were prepared by the students from the Institutes of Social Sciences. Within the scope of Social Science Institute, there were numbers of theses published across the departments of economy, public administration and business administration. Even though number of other institutes was less than others, abundance of variety was considered to be important for the value assigned with sustainable development subject. Many postgraduate students from diverse departments such as natural sciences, educational sciences, environmental sciences, strategic research sciences preferred sustainable development as thesis subject. Finding common area among postgraduate
students from different institutes suggested that sustainable development subject was important in every domain.

![Figure 5. Distribution of Postgraduate Theses according to Institutes](image)

The figure 6 above exhibits distribution of postgraduate theses according to their number of pages. It was seen that postgraduate theses were grouped with respect to their number of pages. This was preferred because grouped-presentation of data facilitates their reading and interpretation. According to the figure, it was concluded that majority of theses on sustainable development were published in number of pages between 101 and 150. When number of pages was assessed, it was seen that the least number of page was 50, whereas the highest number of pages was 530. It was seen that 530-page thesis was doctorate study and accordingly it was providing information in detail. Even though number of page is not directly related with the quality of thesis, average number of page was included in the study because it provides an insight to students who are currently at dissertation stage of their postgraduate study. The figure below includes analysis on keywords used in theses.

![Figure 6. Distribution of Postgraduate Theses according to Number of Pages](image)

Figure 7 exhibits word cloud created by the most frequently used keywords used in postgraduate theses on sustainable development subject. In this cloud, the words in larger dimensions were the ones with higher frequency rate. The words relatively in small size were less repeated among keywords of theses. In order to find conceptual match
between thesis subject of sustainable development and the theme of the word cloud, blue and green color tones were preferred. According to the illustration, the most frequently repeated words in the keyword section of postgraduate theses were sustainable development, green economy, renewable energy, sustainability, welfare, development, climate change, energy policies, environment and environmental issues. These frequently repeated words in the keyword sections of theses especially indicate the subjects associated with sustainable development in their studies. According to the word cloud, the “sustainable development” subject was mostly handled with “development” and “environmental issues”. In the next figure, research method, data collection method, and number of references contained in analyzed theses were exhibited. The theses were required to be downloaded over the system in order to view their research method and data collection methods. However, 23 out of 250 postgraduate theses were restricted for access. Accessible theses were analyzed in terms of their research method, data collection method and number of references.

**Figure 7. Word Cloud Analysis of Keywords of Postgraduate Theses**

The figure 8 exhibits research methods of postgraduate theses. The most notable mistake made in the method section of theses was missing or incomplete information about research method and data collection technique. Even if it was stated, method and technic phenomenon were indicated without making distinction among them. Especially the most frequently encountered problem with theses was preference of mistaken method. It was considered that the conclusions of theses on sustainable development would be arguable if their method or technic information is missing or incomplete. During the analysis of theses, in cases in which method was found to be missing, theses was read by our part to determine employed method and technique so as to include our analysis. Collected data was visualized and exhibited as above. According to the figure, it could be seen that literature review method was the most frequently adopted in the theses on sustainable development. In general, researchers draw conceptual framework and comparative analysis method was conducted on the documents studied. Utilization from quantitative, qualitative and combined analysis methods on sustainable development studies is substantially important to investigate the subject deeper. In this regard, 40 of the studied theses were applied quantitative analysis method; 36 were applied qualitative analysis method. Only 13 theses were analyzed through combined methods of quantitative and qualitative. It was suggested to the students in pursuit of doing postgraduate thesis study on sustainable development to prefer combined method in their research. The next figure exhibits findings on data collection technique employed in research method.
Figure 8. Distribution of Postgraduate Theses according to Research Methods

The figure 9 exhibits analysis on data collection method of postgraduate theses published on sustainable development. Just experienced with the previous figure, similar issues arose during acquisition of the data collection technique. In cases in which data collection technique was not stated or it was mistaken, accurate form of the relevant information was included into the analysis by our part. According to the figure, it was seen that the content analysis was the most frequently employed technique in the postgraduate theses in data collection process. This was because literature review is used most frequently as a research method and information, document and manuscripts accessed through literature review are investigated through content analysis technique. Utility of quantitative, qualitative and combined methods in studies on sustainable development has introduced utility of interview and survey methods in data collection technique during analyses. In terms of distribution of concerned studies, 45 of all analyzed theses preferred survey technique whereas 37 employed interview techniques. Within the scope of the studies on sustainable development, inclusion of certain stakeholders into the study and documenting their point of view in the sampling group for further analysis are considered important for deep analysis of the subject. In the next figure, number of references included in the postgraduate theses was exhibited.

Figure 9. Distribution of Postgraduate Theses according to Data Collection Technique

The figure 10 exhibits the number of references included in postgraduate theses on sustainable development. Number of references was given in groups for better presentation of the analysis. According to the figure, it was seen that the least number
of references was 20 included by a master thesis, the highest number was 600, which was a doctorate thesis. Whereas extensive content of a doctorate thesis, detailed structure, and longer period of study time would legitimize usage of 600 references, usage of 20 references in a master thesis was considered arguable. Theses on sustainable development were mostly found to have 51-100, 101-150 and 151-200 numbers of references.

![Figure 10. Distribution of Number of References in Postgraduate Theses](image)

4. Conclusion

Sustainability and sustainable development subjects are common interests of various disciplines. Increasing significance of sustainability concept has allowed researchers to approach the subject multi-dimensionally. This position of subject has expanded the relevant literature substantially. Multi-disciplinary and comprehensive literature includes diversified descriptions of the concept. It was seen that even though there are many disciplines approaching the subject in the literature, they mostly emphasize persistence, continuity and replenishment phenomenon with sustainability concept. Just as sustainability and sustainable development subject, continuity with every subject requires education. Education on sustainability and sustainable development needs to be given to students at educational institutions and to staff at their business places and organizations.

This study approached sustainable development subject from the education perspective. Postgraduate theses on sustainable development published by Turkish students were investigated through bibliometric analysis method. The objective of this study was to determine how sustainable development subject had been handled by university students through appropriate analysis method. Especially, distribution of postgraduate theses according to their respective institute was considered to be significant indicator of students’ interest into the subject. It was concluded that theses on sustainable development were published by diverse institute and departments of science. New approaches were developed on sustainable development from different domains such as natural science, educational sciences, social science, and medical sciences and etc. Consideration of the subject from diverse areas suggested that sustainability subject had been common problem and orientation of everyone.

One of the primary findings of our analysis was that major deficiencies were determined with preference and application of research method and technique in the analyzed postgraduate theses. At some theses included our analysis, it was seen that method was neglected; technique was confused with method; technique was presented wrongly; and method information was totally avoided. It was considered that the most outstanding finding was “research technique” was confused with “literature review” and survey questions were presented in the “appendix” section in one of the theses on
sustainable development subject. This problem could be eliminated by opening an obligatory “Scientific Research Methods” course as part of postgraduate curriculum of higher education institutions in Turkey.

In Turkey, postgraduate level educations on scientific research, academic writing, and data analysis at higher education institutions are not satisfactory. Postgraduate-thesis level students are required to be given necessary education before their study. At this point, postgraduate education institutions are suggested to update their curriculums, and to add scientific research, academic writing, and quantitative/qualitative/combined research methods courses and/or to increase their credits. Moreover, significant mistakes and deficiencies were determined with theses on sustainable development in terms of number of pages and reference usage. These issues could only be eliminated by the efforts to enhance educational qualities of postgraduate programs.

On the basis of literature review on sustainable development, it was seen that similar other studies were existed. However, our study covered larger sampling group and made classification in terms of subject, domain, department of science and department limitation in the analysis. The present study was the single one which included all postgraduate theses published in the period of 1992-2021 on sustainable development without making any distinction on subject, scientific department, or program. This characteristic of study is considered important in terms of uniqueness and contribution into the current literature. Analysis of all theses in 11 categories was valuable for future researchers to provide more detailed insight. Researchers are suggested to conduct bibliometric analysis on all articles or scientific studies on sustainable development without making any restriction. Implementing a study on sustainable development by adopting a restriction with respect to department, domain or subject would prevent acquiring comprehensive conclusions. Majority of analyzed postgraduate theses on sustainable development were found to have deficient method information. Future researchers on a similar subject for their postgraduate thesis study are suggested to conduct their analyses by paying attention to the method and technical information, academic writing, and scientific research to avoid any missing or deficient information.

References


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