Bibliometric Analysis of Digital Entrepreneurial Education and Student Intention; Reviewed and Analyzed by VOSViewer from Google Scholar

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Abstract—The backdated research dedicated to digital entrepreneurship education is immense, which makes it difficult to create an overview. Conversely, forward-thinking bibliometric visualization mapping and clustering can assist in visualizing and structuring difficult research literature. Hence, the goal of this mapping visualization study is to thoroughly discover and create clusters of EE to convey a taxonomic structure that can oblige as a basis for upcoming research. The analyzed data, which is drawn from Google Scholar through Publish or Perish tool, contain 1000 documents published between 2007 and 2022. This taxonomy should generate stronger bonds with digital entrepreneurial education research; on the other, it should stand in international research association to boost both interdisciplinary digital entrepreneurial education and its influence on a universal basis. This work strengthens student's understanding of current digital entrepreneurial education research by classifying and decontaminating the most powerful knowledgeable relationship among its contributions and contributors. The bibliographic analysis includes 'citation network', 'author's research area' and 'paper content' regarding the desired topic. In this paper, the above three mentioned terms are integrated which produces a bibliographic model of authors, titles of their papers, keywords and abstract by using Harzing's Publish or Perish tool for extracting data from Google Scholar and further using VOSViewer to visualize networking map of co-authorship and term co-occurrence to administer the data for an instinctive and appropriate understanding of university students concerning 'digital entrepreneurial intention' research. This paper uses bibliometric analysis to analyze the keyword co-occurrence and co-authorship and VOSViewer is used for visualization.

Keywords—entrepreneurial intention, bibliographic analysis, digital entrepreneurship education, VOSviewer

1   Introduction

Bibliometric co-citation analysis determines the relation among research articles, titles, keywords and abstracts and is a meta-analytical tool to measure or access the strength of any variable, does its effect exists and if then positive or negative. Most developing countries are facing "youth unemployment" which is a contemporary issue in all developing and under-developed countries, government, academic institutes and researchers are focusing on managing a high population without poverty [1]. The use of up-to-date technology helps in increasing the efficiency of production, decreases load from labor and the objective can be achieved in a short time [2]. University students are not given the concept of entrepreneurship but since childhood parents teach them to achieve an extraordinary salaried job because of which their intention develops of becoming a job seeker instead of a job creator [3]. Unemployment for youth is a big challenge in the current era, overcoming this challenge is possible by promoting entrepreneurial intention among students.

As the new educational concept "entrepreneurship" must be introduced, parents should support their children to start a business which is possible through developing entrepreneurial intention and teachers should also contribute to developing student's entrepreneurial intention [4]. It is difficult for non-expert graduates to start their businesses; endorsing internships throughout the degree can make them skillful, experienced and trained. This development of knowledge, skills and ability teaches them how to tackle business problems, take risks and make decisions [6][7][8]. This study discovers answers to the following research questions:

Research Question 1 What is the guiding principles to extract data from Google Scholar and create visualizing maps?

Research Question 2 Which title and abstracts of several research articles are the most dominant in Entrepreneurship research?

Research Question 3 How Theory of Planned Behavior (TPB) clustered associated and linked with Entrepreneurial Intention?

Research Question 4 Which research streams related to Entrepreneurship have received the most attention and will be used in the future?

Therefore, this study did a bibliometric analysis of the entrepreneurship intention of university students through a visual knowledge map of entrepreneurship from 2007–22. To answer the research questions. This study developed the context, content analysis and citation analysis for continuing research on the entrepreneurial intention of university students in a superior way.

University students must be trained about starting their business, as it confirms that every individual can carry job successfully [8]. Teachers and parents normally don't introduce a new option "entrepreneurship" which students/ children may need to work on as a high population decrease job opportunities in developing countries [9][10]. They need to be motivated through providing a platform like Business Incubation Center where they can share their ideas and thoughts to start up a new business and students with the best idea must be rewarded some cash for startup by the government or the institute [11].

2 Significance of study

This study aims to develop future researcher methodology. Other articles comprise a summary of their topic and its networking through VOSViewer. The emergence of Harzing's Publish or Perish tool and VOSViewer is studied probably for the first time in this study. Research clusters were produced by VOSViewer is given in tabular form and networking of Entrepreneurial Intention is represented in visual form. This study will help researchers to extract data on the desired topic from Google Scholar without paying. Those students who belong to underdeveloped and developing countries, with no access to expensive databases can easily collect data for bibliometric analysis. Therefore, bibliometric analysis help researchers to classify the roots and the current significance of a given variable [12][13]. Investigation of the literature confirms that both Harzing's Publish or Perish tool and VOSViewer are rarely used. Hence, this study used two different software used together.

This study will further discuss social entrepreneurship that has a large scope in today's research; it will help in reducing poverty and unemployment [14]. This will automatically lead to a better life. Entrepreneurship is being promoted highly but many limitations are seen in the development of business opportunities in the framework [15]. Because of this situation, this study will show how much importance does Entrepreneurship deserves.

3 Literature review

This paper targets university students, their intention development regarding Entrepreneurship shall be the priority of academic institutes [16]. This paper also searches the journals which are related to the entrepreneurial intention of university students, variables like student perception, economic growth of the country, unemployment, graduates (university students), Business Incubation Centers are also kept in sight while finding term co-occurrence of authors researching on Entrepreneurial Intention. The data source of this article from where data is extracted is Google Scholar. The bibliometric method is used to introduce co-citation, co-authorship, keywords co-occurrence, citation analysis and term co-occurrence. To understand the linkage and networking among different variables [12].

This study used VOSViewer Van Eck and Waltman [17] as it provides a map with clear networking of each variable with the other. The major objective of this paper is to make a citation network, paper content is to understand the linkage with different variables affecting Entrepreneurial Intention the dependent variable of this study. In VOSViewer simply enter Data File and visualize the networking of different journals, authors and their co-relevance. VOSViewer is used to show the author's cooperative relationship and to obtain a scientific visual networking map [18]. The main objective of this study is to provide researchers free access for data collection and research through VOSViewer.

In this bibliometric analysis, a networking map of Entrepreneurship is being developed which gives rise to Citation Network Topic Model (CNTM) [19]. This study proposes an innovative and efficient implication of an algorithm for the CNTM to discover

subgroups of research on Entrepreneurial Intention [20]. The CNTM allows to both model the author and text by manipulating the association between the authors and their research topics.

The demanded databases are made available online this study demonstrates improved performance in both free data accessing and entrepreneurial intention's linking with other terms co-occurred, compared to several articles. Moreover, this study allows extraction of additional useful knowledge from google scholar, such as the visualization of the author-topics their keywords and terms co-occurred network. Additionally, this study recommends a simple method to integrate observation on the desired topic by using Harzing's Publish or Perish tool for achieving further improvement on the clustering task [21].

Theory of Planned Behavior is a theory used to predict and understand the behavior of others towards any person, thing, process or work [22]. The theory of planned behavior truly helps in developing entrepreneurial intention [23][24]. This theory works to develop a positive attitude and behavior of a person it aims to bolster the behavior, thoughts and intention of one [25][26]. According to this study; the intention, behavior and thoughts of university students need to be strengthened regarding entrepreneurship. Their entrepreneurial intention needs to be nourished and they may have idea about job creation, its significance and benefits in this era.

However, one model and theory is followed in this study; the Theory of Planned Behavior and Citation Network Topic Model have been used in this study because this paper aims to strengthen the entrepreneurial intention of university students with the help of analyzing its visualization network. Provided clear explanations regarding the role of curiosity in entrepreneurial opportunity recognition process is common. This study will also discuss in its figures regarding the SME entrepreneur's capacity in order to identify new business opportunities [27].

4 Methodology

Harzing's Publish or Perish tool is used to get a data file, researchers can collect the data from all types of databases like Crossref, Google Scholar, Google Scholar Profile, PubMed, Microsoft Academic, Scopus, Web of Science, Google Scholar is most useable, known and free database. In this research two basic software are used to collect and analyze data Harzing's Publish or Perish tool version 7.29.3156.7695 is used to collect a data file and VOSViewer of version 1.6.16 is used to display that data file in the shape of a network file. Write Harzing's Publish or Perish tool in any search engine like google, download the software and open the software. As shown in Figure 1 after opening the software how it looks and for getting a data file click on Google Scholar because we don't have access and want to collect free data without using any expensive or payable database like other options are also given.
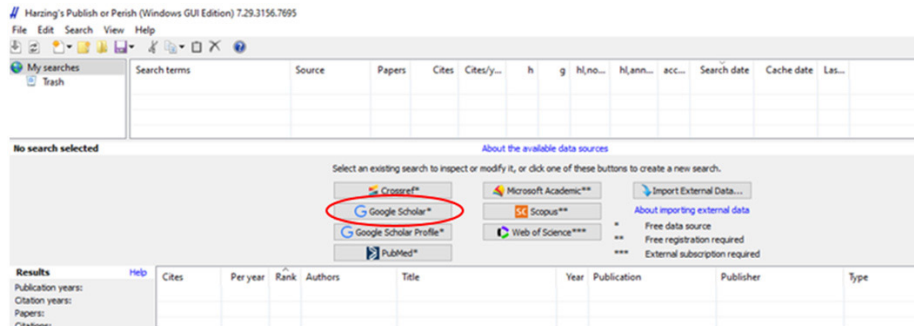
Fig. 1. Harzing's Publish or Perish Tool's interface

As shown in Figure 2 Step 1 after clicking the Google scholar tab is to insert the desired period for example 2006 to 2021 total period of 15 years. Step 2 write the title in inverted commas like: "entrepreneurial intention" as shown in Figure 2. Step 3 limits your results; the minimum number of results starts from 200 and the maximum number of results is 1000. Step 4 Click the search tab and the results will be out. The above detail is the answer to Research Question 1.
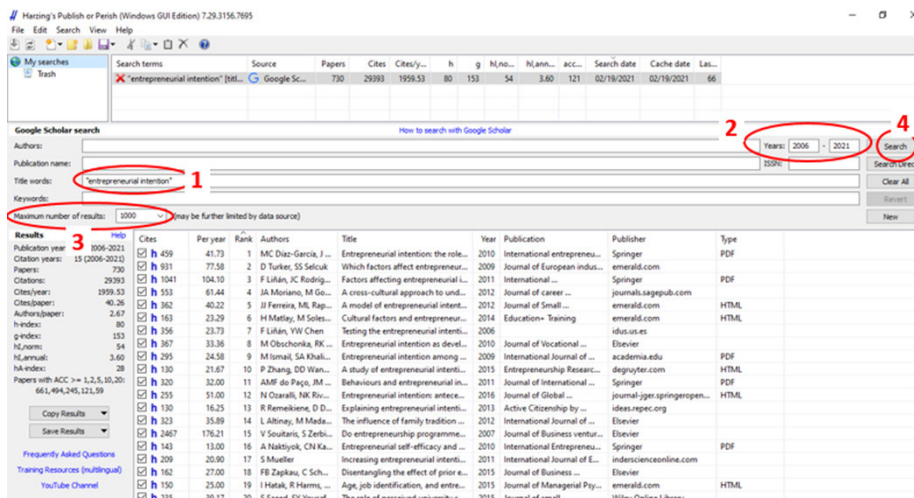
Fig. 2. Steps for collecting data through Harzing's Publish or Perish Tool

After obtaining desired results, click the tab "Save Results" on the very left. Sve the file in (RIS) format Refrencemanager file. Another option is the endnote, file in this format can be saved only when there is an endnote on the PC. RIS is recommended and the file is ready to step forward the research.

Now download VOSviewer from google chrome for obtaining the results. Research with VOSViewer in developing countries on bibliometric analysis is rare because every research institute is not able to pay for expensive databases like Web of Science, Scopus, Emerald, Springer, Elsevier, etc. This research is acted with the help of VOSViewer without paying to any database, without any access. In VOSViewer Van Eck and Waltman [28] there are three ways to visualize the data:

4.1 Network visualization

Items are signified by their label in a circle shape. The size of the circle and label of an item is denoted by the weight of the cluster. The higher the weight the larger is the label of the circle and vice versa. Lines between items represent links or networks [29].

4.2 Overlay visualization

It is alike the network visualization but items are colored differently. There are two ways in which items can be colored in the overlay visualization. Its colors range blue represents less weight and green or yellow represents the heavy weight [29].

4.3 Density visualization

There are two options for density visualization. One is item density visualization, followed by cluster density visualization. Same as density visualization each item has a color that indicates its density. Colors range from blue (less) to green (normal) to yellow (highest) [29].

The main window of the VOSviewer is shown in Figure 3. It consists of the following five panels:
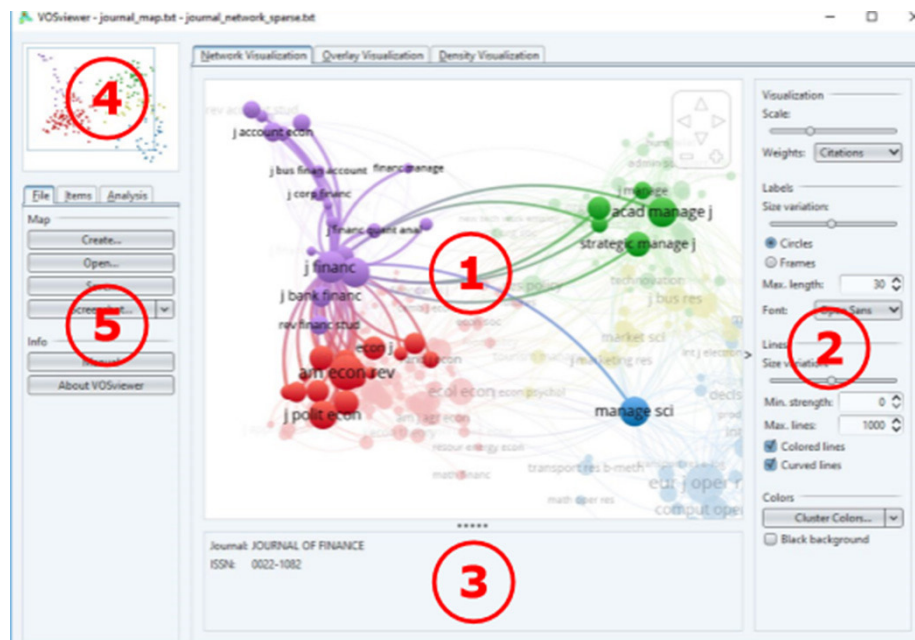

Fig. 3. Main window of VOSViewer

- Main panel: The main panel presents a visualization of the map. Zoom and scroll functionality can be used to discover the map in full aspect.
- Options panel: It can be used to make changes to the visualization of the map open in the main panel.

- Information panel: The information panel presents descriptions of items on the map.
- Overview panel. It presents an overview of the map.
- Action panel. The action panel can be used to perform different actions, like creating a new map, opening or saving an existing map, taking a screenshot, and apprising the layout or the clustering of the map.
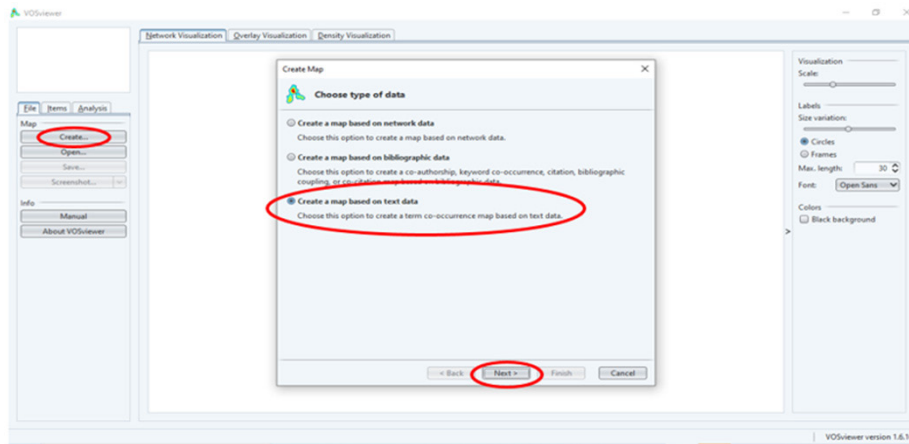

Fig. 4. Interface of VOSViewer about starting steps for creating a visualizing network map

The next step after opening VOSViewer is to click on the "Create" tab and create a map window will be opened Step 2 is to select one option among three which is "Create a map based on text data" and click on "Next". As shown in Figure 4.
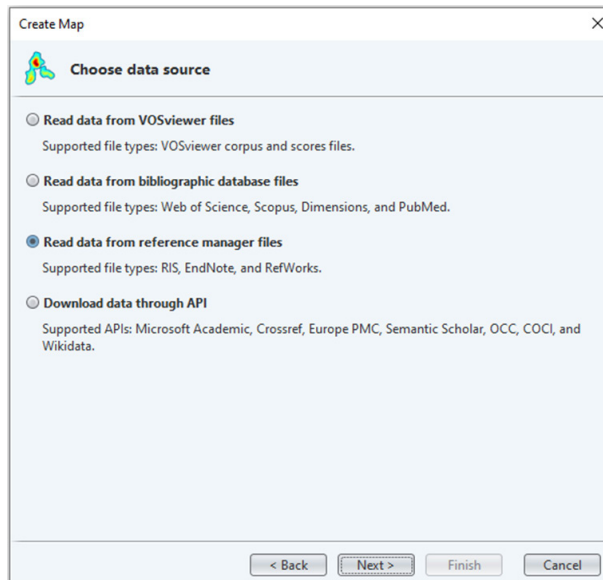

Fig. 5. Choose data source

Now, it's time to choose the data source as it is discussed above the file from Harzing's Publish or Perish tool must be saved in Reference manager file format then click on "Next" as shown in Figure 5.
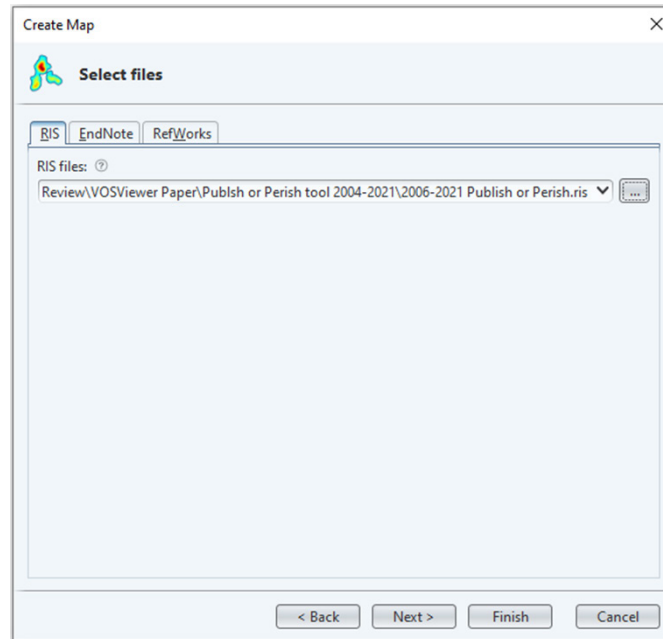

Fig. 6. Select the data file collected from Harzing's Publish or Perish Tool

Select the file wherever it is on the PC, Click on the file and open it, as shown in Figure 6 after choosing the right file click on "Next".
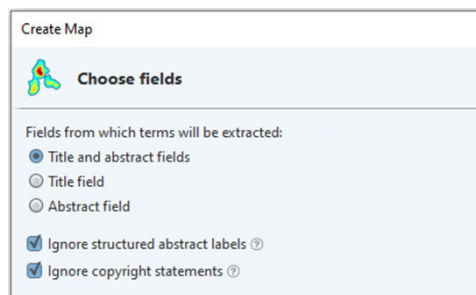

Fig. 7. Choose field

Now, choose the field of data that required the network contain the title and abstract field keyword co-occurrence or both as shown in Figure 7. Choose the desired field of data and click "Next".
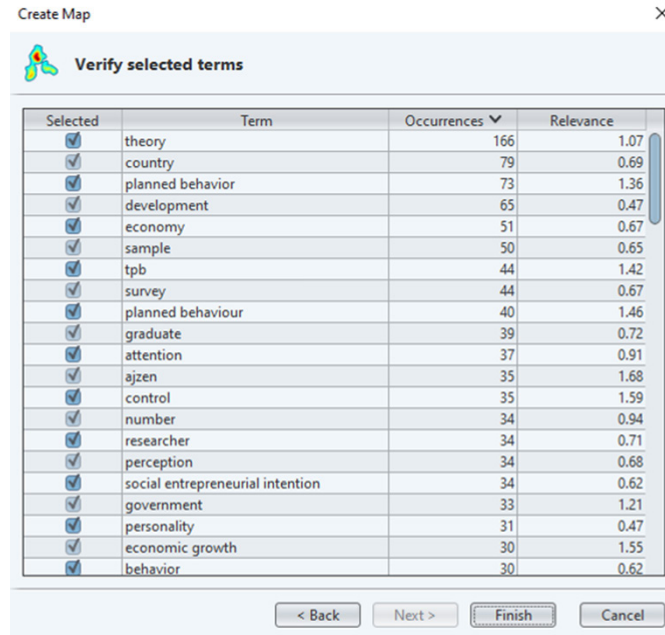
Fig. 8. Verify selected items

Now, all the terms which were co-occurred will be shown. If you want to eliminate any keyword, unselect it and click on the "Finish tab". As shown in Figure 8 the visualizing data network map will be displayed.

5 Results

As a result, after collecting data from Google Scholar and creating a networking map in VOSViewer, the frequently occurred keywords were related to Entrepreneurial Intention as shown in Figure 9. In Figure 9 It is visible that Entrepreneurial Intention is having the highest score as its cluster is heaviest. In this study, Entrepreneurial Intention is taken as Dependent Variable. Whereas, Entrepreneurial Self-Efficacy, Social Entrepreneurial Intention and Theory of Planned Behavior are independent variables and are in a low score but are citing each other repeatedly [30]. The theory of planned behavior is mentioned with different names and has 4 items as shown in Figure 9. Namely: Ajzen, TPB and Planned Behavior (twice). Linkage of TPB with entrepreneurial intention is an answer to Research Question 3.
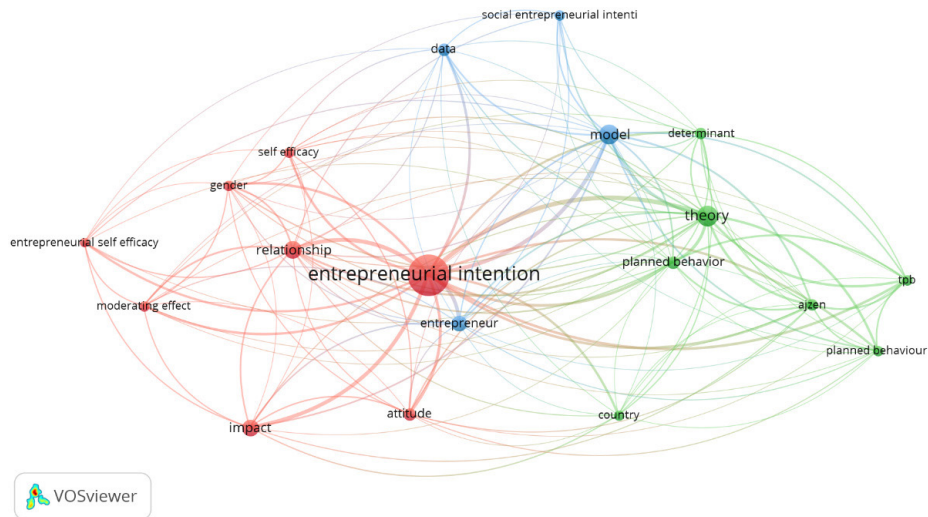
Fig. 9. Network visualization of keyword co-occurrence

There are hundreds of authors who work on Entrepreneurship but some of the authors who have cited each other since 2006 up till, the last 15 years are shown in Figure 10. This Figure shows us a total of 34 authors, 9 clusters (different 7 colors) and network links are 55. More publications are represented by a heavy colored circle, authors with less number of publications are shown with a low weighted coloured circle.
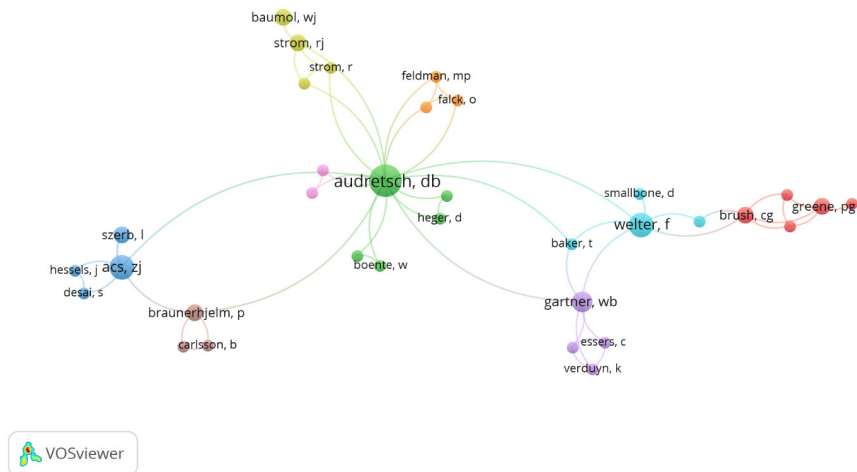

Fig. 10. Co-author citation

This study also shows the terms co-occurrence of words. Basically, a term is a word or any expression that has an exact meaning in some uses. Terms used in the title and abstracts of any article, their citations with each other are shown in Figure 11. Figure 11 is a Visualization Networking map of term co-occurrence. There is a total of 97 terms

that occured in the layout shown in Figure 11. There are 4 clusters: Red, Green, Blue and Yellow. The total link strength is 3069 of the items. Figure 11 shows terms co-occurring in the abstract and title of different articles regarding Entrepreneurship which is the answer to Research Question 2.
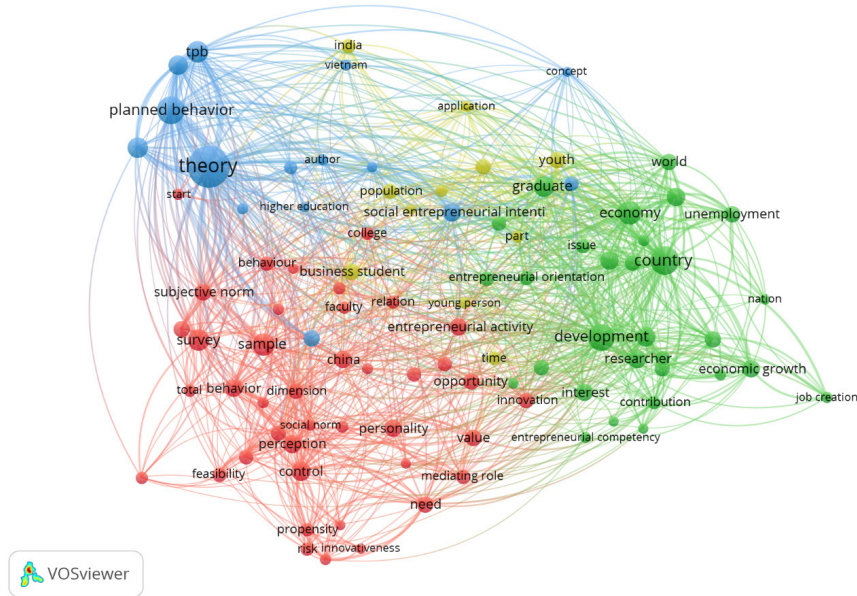

Fig. 11. Knowledge map of term co-occurrence

The map can be visualized in three different formats: Network, Overlay and Density. These three formats are discussed in detail above in the Methodology section of the paper. Density Visualization is shown in Figure 12 which shows three colors and the weight of an item. Heavier the yellow circle means that item has the highest score or is more in number, green color shows moderate score whereas items with least or lowest score are colored blue. For example, the theory has the highest score as it has a high dense yellow color, economic growth shows green color which represents not a higher nor a lower dense volume but moderates whereas, Job creation have a bluer and light green touch which represents that job creation scores the lowest.

Fig. 12. Knowledge map of term density

Overlay means to set one thing on top of the other, the layout shown in Figure 13 is an overlay visualization map. This map has a scale shown under the map which represents years by the color of the cluster. There are different colours in the networking which represents time. As in Figure 14, the scaling is given that purple represents 2016–2017, blue represents 2017–2018, zinc represents 2018–2019, green represents 2019–2020, light green represents 2020–2021 whereas, the last and final yellow colour represents 20201–2022.
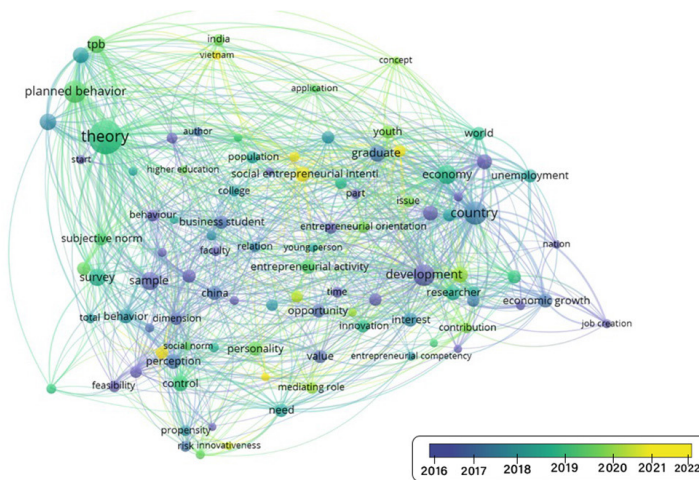

Fig. 13. Overlay visualization of term co-occurrence 2016–2022

This study has discussed the Overlay Visualization map in detail. All the four different times are shown in different Figures with their high scored term. Figure 14 shown is from the year 2016.0 to 2016.5 namely cluster 1, purple color. The layout of Figure 14 shows that at that time "development" was the most cited term when it comes to Entrepreneurial Intention as there were no proper policies, study or attention it was given as compared to nowadays.
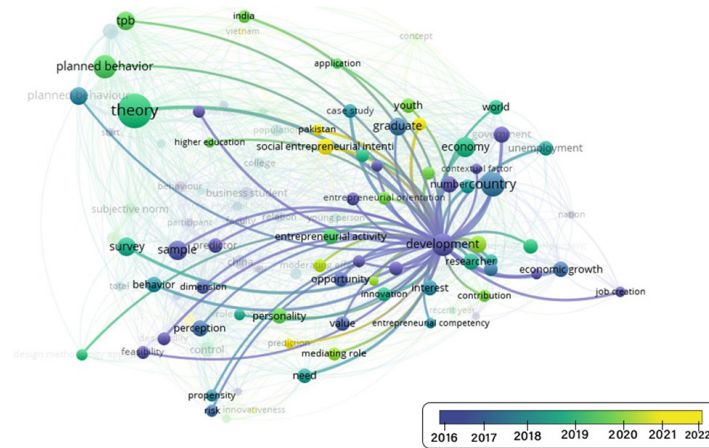

Fig. 14. Overlay visualization of 2016–2016.5 dominating "development" in purple color

This study has discussed the Overlay Visualization map in detail. All the four different periods are shown in different Figures with their high scored term. Figure 13 shown is from the year 2017 to 2019 namely cluster 1, purple color. The layout of Figure 14 shows that in that period "development" was the most cited term when it comes to Entrepreneurial Intention as there were no proper policies and lack of attention.
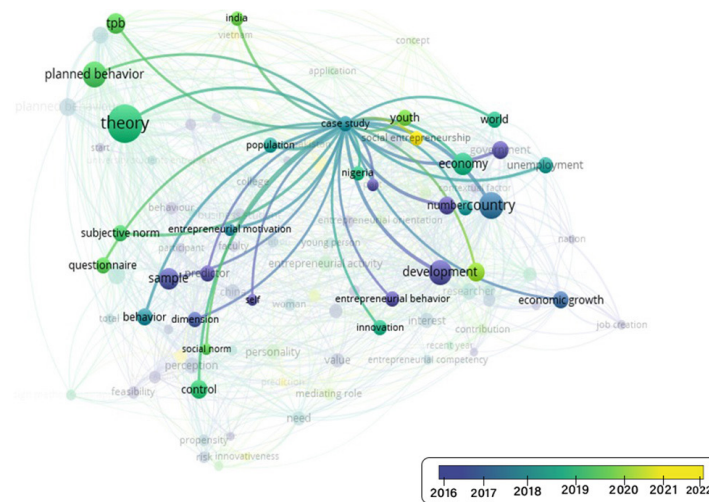

Fig. 15. Overlay visualization of 2017–19 dominating "case study" in zinc colour

The layout shown in Figure 15 represents the zinc color prominently, from the period of 2017–2020, which tells that the case study was mostly cited by authors in that period case study was the most cited term when it comes to Entrepreneurial Intention as there were fewer examples to motivate students, for seeking the attention case study was given more value at that time. The layout shown in Figure 15 represents the zinc color prominently, from the period of 2017–2017.5, which tells that the case study was mostly cited by authors in that period.
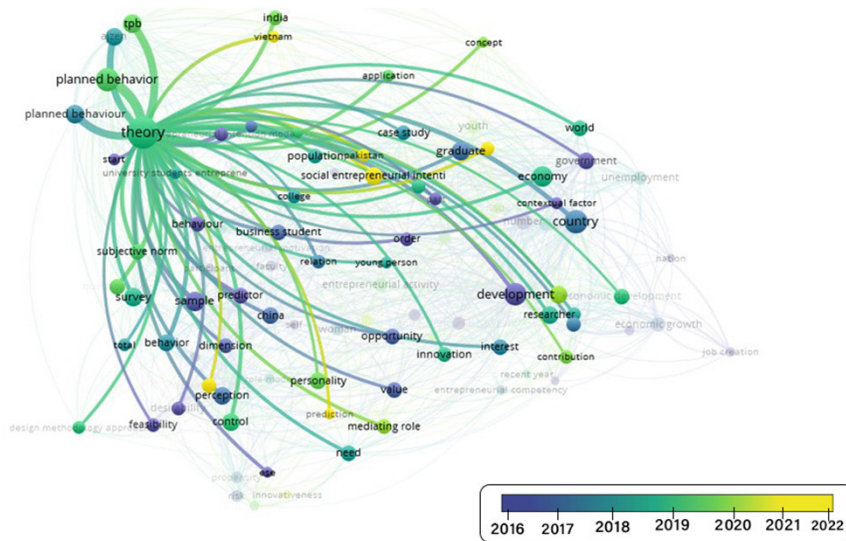

Fig. 16. Overlay visualization of 2017–20 dominating "theory of planned behaviour" in light green colour

Figure 16 shows the period from the year 2017.5–2018.0. The layout says that theory is the most cited term in that period. In that period theory was the most cited term when it's about entrepreneurial intention as there were fewer theories discussed number of studies in which theoretical implications were applied. Figure 16 represents the period from the year 2017.5–2018.0. The layout says that theory is the most cited term in that period.
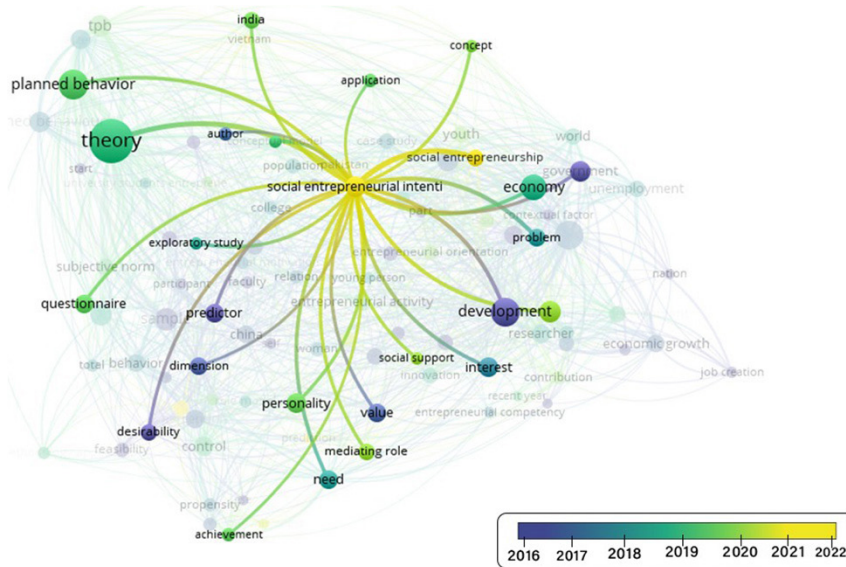
Fig. 17. Overlay visualization of 2017.5–2022 dominating "social entrepreneurial intention" in yellow colour

The layout in Figure 17 highlights the yellow colour and period from 2017.5 to 2022 and states that social entrepreneurship was the most cited term in that [31][32] [33]. The answer to research question 4 is in Figure 17. Social entrepreneurial intention is the variable on which future researchers would focus and would be given more spending and attention. The layout in Figure 17 highlights the yellow color and period from 2017.5–2019 and states that "social entrepreneurship" was the most cited term in that period. Social Entrepreneurship will be promoted in the coming years [34]. The answer to Research Question 4 is in Figure 17 as shown. Social Entrepreneurial Intention is the variable on which future researchers are focusing and will be given more spending and attention.

6   Future direction and conclusion

Entrepreneurial Intention is a developing construct and it is a significant field for under developing and developing countries. The main future direction in this paper was to make citation mapping and cluster analysis easier. More recent articles are all based on research through paid expensive databases because of which many researchers could not show their real potential in this methodology, no matter their relative contribution [13][35]. The limitation of this paper is that it cannot be possible to access all articles as most of the prestigious journals are paid and cannot be accessed from Google Scholar. This study thus focused Entrepreneurial Intention of university students by extracting data from Google Scholar through Harzing's Publish or Perish tool. In last, the data file was entered in VOSViewer and networking maps of citation analysis were created [36].

7 Acknowledgment

8 References

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