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STUDENT ENTREPRENEURSHIP: A BIBLIOMETRIC ANALYSIS

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Abstract

The present paper aims to investigate the literature on student entrepreneurship in order to identify the most recent research field. The study relied on the co-citation analysis and bibliographic coupling techniques to investigate a complete data set of student entrepreneurship publications.
Results of the co-citation and bibliographic coupling analysis have identified two main approaches (exogenous and endogenous) and five research topics (university ecosystems, innovation intermediates, personality, personal background and behaviour theory) on student entrepreneurship.
The present study represents the contributions offered by studies about entrepreneurship strategies. Building on findings emerging from a qualitative content analysis on clustered publications, the authors discuss a future research agenda that is expected to inspire future studies on the student entrepreneurship field.

1. Introduction

Student entrepreneurship has received growing attention at international level (Parente & Feola, 2021; Wright et al., 2017). However, there is not just a single definition of student entrepreneurship, but several interpretations Gupta et al., (2017). More specifically, a first group of researchers referred to *student entrepreneurs* as students enrolled in an entrepreneurship course or program (Fiet, 2001; Robinson et al., 1991). A second group of researchers argue entrepreneur students as students engaged in preparing a business plan for a new or existing growth-oriented business (Katz et al., 2003). Finally, a third group considers entrepreneur students as individuals who are actively pursuing academic courses while simultaneously managing a business (Ridder & Sijde, 2006).

Furthermore, the literature on the topic is extensive and scholars have highlighted different aspects. Some have investigated the role of external factors such as the family, environment, and ecosystem of innovation; while others have investigated micro factors such as personality traits, locus of control, and personal values (Gupta et al., 2009; McGee et al., 2009; Ahmed et al., 2010). Some scholars investigated the entrepreneurial intention of students in developing countries (Tkachev & Kolvereid, 1999; Gird & Bagraim, 2008; Jones et al., 2008) and others conducted some transnational research (Liñán & Chen, 2009; Moriano et al., 2011; Engle et al., 2010). Although there are some reviews of the literature, they do not identify the main research areas including new studies on the topic broad topic of student entrepreneurship. For example, Galvão et al., (2018) provided insights of a systematic literature review of entrepreneurship education and training as facilitators of regional development. Da Silva et al., (2015) analyzed in detail only the literature on engineering education, develop and drive models of entrepreneurship education in engineering. Moreover, Pittaway & Cope (2007) explored different themes within entrepreneurship education.

However, although systematic literature reviews are recognized methods for conducting evidence-based policy (Tranfield et al., 2003), further approaches should be used to perform an accurate and systematized analysis of the literature (Rialti et al., 2019).

Thus, the paper aims to explore the key themes of student entrepreneurship and provide guidance over future research efforts. Based on these arguments, this study addresses the following research question: *what main research areas are covered by the literature focusing on student entrepreneurship, within the management field?*

More concretely, the main purpose of this research paper is to present a literature review of student entrepreneurship through bibliometric tools. More concretely, the approach used in this study is a two-step bibliomet-

ric approach: Co-citation and Bibliographic Coupling analysis. Co-citation and Bibliographic Coupling analysis are semantic similarity measures for documents that make use of citation relationships. However, while co-citation use frequency with which two documents are cited together by other documents (Hsiao & Yang, 2011), bibliographic coupling shows probability exists that the two works treat a related subject matter (Kessler, 1963). Co-citations and Bibliographic Coupling analysis are complementary. More concretely, the simultaneous use of bibliographic analysis and co-citation analysis allows a more accurate analysis of the literature. Indeed, in a database where link is restricted, Bibliographic Coupling analysis the latest documents and only a limited number of very old papers, while co-citation analysis clusters the eldest documents without clustering newer documents that have not yet been cited.

The paper is structured as follows: in the first section, we illustrated the background of student entrepreneurship; in the second section, we described the methodology used to identify the main studies that have addressed the topic of the student and research fields and future emerging research trends; in the third, section, we display the main results of the Co-Citation and Bibliographic Coupling analysis and in the fourth section, we discuss research approaches and topics emerging from the analysis. Subsequently, in section five and six, we conclude our research and present proposal for future research.

2. Methodology

Bibliometric or "analysis" methods are established as a scientific method and are an integral part of research evaluation methodology, especially in scientific and applied fields (Cucino et al., 2021b; Ellegaard, & Wallin, 2015). For example, these methods are used more theoretically and practically when studying various aspects of science to classify institutions and universities around the world (Ellegaard & Wallin, 2015). In particular, through a keyword analysis and the application of statistical methods, bibliometric analysis allows to identify the most popular topics covered in the field of student entrepreneurship. More specifically, bibliometric analysis allows two main aims: (1) to identify changes both in terms of number and content, within the research on student entrepreneurship (De Bakker et al., 2005) (2) to provide the state of the art of student research entrepreneurship by providing useful information for experts seeking to evaluate scientific activity (Oliva et al., 2006). To achieve our goal, two types of bibliometric analysis have been proposed: *Co-Citation analysis* and *Bibliographic Coupling analysis*.

Co-Citation analysis is used to locate similar documents. In fact, it

is defined as an indicator of document similarity, and it is based on a frequency count (Small, 1973; Hsiao & Yang, 2011; Culnan 1986). As suggested by several authors, we have chosen a threshold of 20 citations for Co-citations analysis (Crupi et al., 2020; Hsiago & Yang, 2011).

Bibliographic Coupling occurs when a reference is used by two articles as a coupling unit between these two articles (Kessler, 1963). The intensity of the strength of the Bibliographic Coupling analysis depends on the number of references that the two articles have in common (Egghe & Rousseau, 1990).

More concretely, our research followed four steps. The first step was to identify the keywords to conduct the analysis. In order to identify the most suitable publications, bibliometric analysis has been conducted by using the following search strategy for searching titles, abstracts and/or keywords: "student" and "entrepreneurship."

The second step was the identification of the database. More specifically, we used the Scopus database as it is very wide. In fact, it completely covers 20,000 main journals which add up to around 70 million searchable records. It is also widely used in the field of entrepreneurship (Scornavacca et al., 2020). This peculiarity allows us to examine a wider collection of articles that is focused on student entrepreneurship.

The third step was the selection of documents. Thus, for this analysis, we considered: 1) only the articles published in English, in order to ensure international relevance; 2) the publications of the last ten years, in order to have an indication of the phenomenon in recent years (2010-2020); 3) only the articles with reference to the business area, in order to focus the analysis object only on the managerial area.

The fourth step involves the tool for data analysis. For this analysis, we have selected the VosViewer software. VosViewer (www.vosviewer.com) is a free program developed to create, visualize and explore two-dimensional scientific bibliometric maps (Van Eck et al., 2010). VosViewer considers the distance between two words which can be interpreted as an indication of the correlation of these words based on the number of occurrences in the document (Cardona & Sanz, 2015). In addition, VosViewer is one of the most used software by entrepreneurship researchers for bibliometric analysis (Cucino et al., 2021b; Donthu et al., 2020; Castillo-Vergara et al., 2018).

3. Findings from the bibliometric analysis

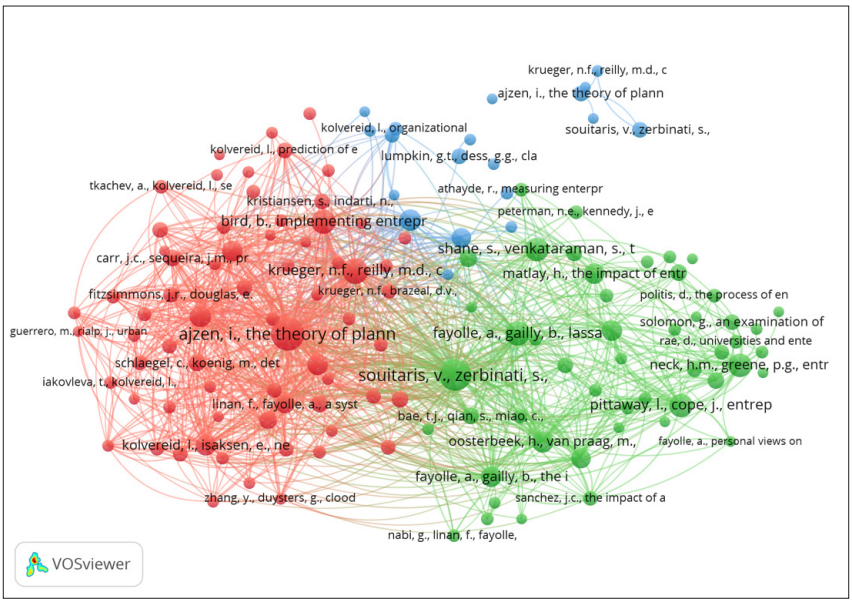
This section shows the main results of the bibliometric analysis (Co-Citation and Bibliographic Coupling analysis) to which documents associated with research on student entrepreneurship from 2010 to 2020 have been applied. Through the four steps previously identified, 1812 results had been selected. In the following session, the analysis of these 1812 documents will be illustrated in relation to the Co-Citation and Bibliographic Coupling analysis.

3.1 Co-Citation analysis

The first results presented below are related to the Co-Citation analysis. From 1812 documents, we identified a minimum number of citations of 20 cited references. This minimum number of cited reference citations is in line with previous studies on citation analysis (Crupi et al., 2020; Lv & Ma, 2019). Thus, from 1812, 72504 references cited are identified. Of these references, only 136 meet the minimum number of citations of 20 cited references threshold.

Subsequently, the 136 documents are analyzed by the first two authors. In particular, the two authors independently analyze the three clusters identified by the software in four steps. First, each author independently organized the files for individual elaborations on the basis of name, year, cluster identified, abstract, and number of citations. Second, each author independently studied and classified the paper abstracts mostly by identifying keywords for each paper. Third, all the authora studied the main documents and, on the basis of the contents of each cluster elaborated title proposals, for themselves. Finally, the authors discussed and defined the contents and consequent titles of the clusters. Thus, the following section shows the three main clusters that emerged from the analysis (Figure 1).

Figure 1 – Co-citation analysis results



Source: authors' elaboration

3.1.1 Cluster 1 – Meso approach: behavioral theory

The first cluster, indicated with the red color in Figure 1, identifies the studies in the field of *planned behavior theory*.

In previous studies on student entrepreneurship, social psychologists and scholars of behavioral disciplines focused on the individual characteristics (Ajzen et al., 1991). In particular, they studied how the processing of information, available to an individual, mediates the effects of biological and environmental factors on individuals' behavior.

Other authors have focused on elements that influence human behavior, such as social attitude, personality trait (Ajzen, 1988; Campbell, 1963; Sherman & Fazio, 1983), risk aversion, utility expected from independence (Douglas & Shepherd, 2002), moods, but also on contextual factors of entrepreneurship such as social, political, and economic variables (Bird, 1988).

Several theories have been proposed in this cluster to address the psychological processes involved in the self-efficacy of the individual, defined as the belief of a person in his ability to perform a task. In particular, Bandura (1977) presents a theoretical framework to explain psychological changes by showing how psychological procedures alter the level and strength of self-efficacy. In his study, he shows how persistence in a given activity pro-

duces mastery experiences and an improvement in self-efficacy with a reduction in defensive behavior. In practice, as the effort and time sustained in the face of obstacles and adverse experiences increases, the better self-efficacy will be. Boyd & Vozikis (1994) further develops the entrepreneurial intentionality model by suggesting that individual self-efficacy influences the development of entrepreneurial intentions and behaviors.

Entrepreneurial intentions understood as thought processes underlying the creation of business plans and analysis of opportunities are at the heart of this cluster (Bird, 1988; Boyd & Vozikis, 1994). Entrepreneurial intentions are influenced by holistic thinking (Bird, 1988) and it also influences some organizational results such as survival, development, growth, and change. For this reason, the study of entrepreneurial intentions has provided and continues to provide a way to advance entrepreneurial research (Bird et al., 1988) and has been the basis for student entrepreneurship studies.

The application of planned behavior theory to analyze the factors influencing entrepreneurial intent among university students is applied by Autio et al (2001). The study provides important evidence by identifying behavioral control perceived as a determinant of entrepreneurial intention in various countries such as Finland, Sweden, the United States, and the United Kingdom.

3.1.2 Cluster 2: Entrepreneurship education

The second cluster, indicated with the green color in Figure 1, focuses mainly on *entrepreneurship education*. Young people are increasingly the target of entrepreneurial policy initiatives and the teaching of entrepreneurship in schools has also increased in recent years. For this reason, some authors measure the impact of these programs. In particular, Athayde (2009) investigated the impact of entrepreneurship education programs in six secondary schools in London and the United Kingdom. The study showed that participation in a corporate program can have a positive influence on entrepreneurial orientation. Bae et al., (2014) investigated the relationship between entrepreneurship education and entrepreneurial intentions on a sample of 37,285 individuals, finding a small significant correlation between entrepreneurship education and entrepreneurial intentions. Fayolle & Gailly (2015) argued it is necessary to consider entrepreneurship education from a holistic point of view, considering it in its wide diversity, both from an ontological and educational point of view. In other words, it is necessary to develop a common framework for evaluating the design of entrepreneurship education programs (Fayolle et al., 2006). Fiet (2001) investigated the debate about whether entrepreneurship can be taught to students by dealing with the theoretical side of teaching entrepreneurship. This article joins Kuhn (1970) who claimed that "theory is the most practi-

cal thing we can teach students". In particular, he commented on 18 programs, revealing a great divergence of topics and the possible causes of this divergence. One way to add more content would be to encode the language by emphasizing more deductive than inductive approaches.

Finally, other authors have focused on the learning stages. In particular, Cope (2005) proposes three distinctive and related elements of entrepreneurial learning; dynamic time phases, related processes, and general characteristics.

3.1.3 Cluster 3: micro approach, personal background

While the third cluster indicated with the blue color in Figure 1 focuses mainly on entrepreneurship programs, the latter cluster focuses on *demographic factors* and *educational background*. In particular, Kolvereid & Moen (1997) identify greater entrepreneurial intentions in corporate graduates than other graduates also investigating the reasons for choosing a career (Kolvereid, 1996). Souitaris et al (2007) focuses on two types of students; science and engineering students showing how an entrepreneurial path within their course of study positively influences entrepreneurial intentions.

Hamidi et al., 2008 instead analyze the importance of creativity. In particular, the authors investigate whether the students' creative potential is linked to their intention to engage in entrepreneurship by identifying a positive relationship. Their results indicate that creativity exercises can be used to increase students' entrepreneurial intentions.

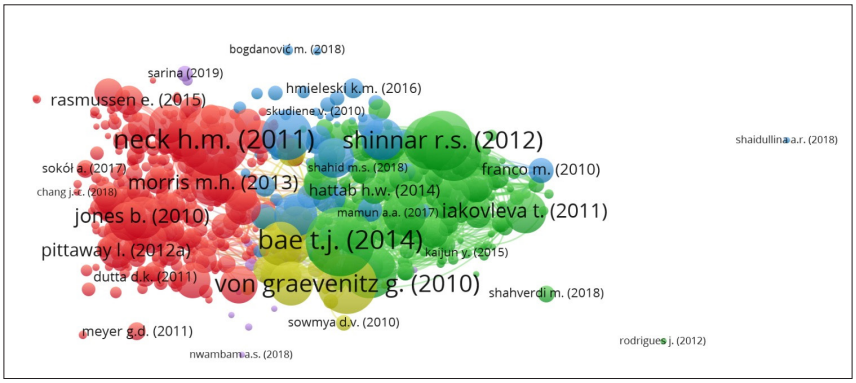
Other studies investigate the relationships between gender and business intentions among students (Wilson et al., 2007; Zhao et al, 2005).

3.2 Bibliographic coupling analysis

Co-citation analysis data were used to identify scientific publication and research trends (Ferreira et al., 2017) interrelated with student entrepreneurship. However, to provide future research directions, we strengthen our first co-citation analysis result through the bibliographic coupling analysis. Thus, from the documents of 1812, a minimum number of 4 citations of a document are identified. Thus, starting from 1812 documents, 773 documents meet a minimum number of 4 citations of a document. Subsequently, the 773 documents are analyzed by the first two authors. In particular, the two authors independently analyzed the three clusters identified by the software in four steps. First of all, each author independently organized the files for the single elaborations on the basis of name, year, identified cluster, abstract, and number of citations. Second, each author independently researched and classified the article abstracts primarily by identifying the keywords for each article. Thirdly, each author

studied the main documents and based on the contents, for each cluster, elaborated the title proposals or themselves. Finally, the authors discussed and defined the contents and consequent titles of the clusters. Therefore, the following section shows the five main clusters that emerged from the analysis. More concretely, Figure 2 shows the results of the Bibliographic Coupling analysis.

Figure 2 – Bibliographic Coupling analysis results



Source: authors' elaboration

3.2.1 Cluster 1: The role of entrepreneurial intentions

Although entrepreneurship education is recognized as important (eg, Crant 1996; Donckels 1991; Robinson & Sexton 1994; Zhao et al., 2005), the first cluster (red) focuses on studying students' *entrepreneurial intentions* (Krueger & Brazeal 1994; Peterman & Kennedy 2003).

Entrepreneurial intentions are the basis of the entrepreneurial process and it appears to be a new subfield of analysis. However, the available evidence suggests that not all business intentions ultimately turn into actual behavior when starting and running a new business. Shirokova et al. (2016) analyzed the entrepreneurial spirit by examining the intention-action gap among entrepreneur students. In particular, the authors argue that individual characteristics (family business background, age, sex) and environmental characteristics (university environment, avoidance of uncertainty) influences the translation of entrepreneurial intentions into entrepreneurial actions (Shirokova et al., 2016).

Other studies have explored gender differences in the perception of entrepreneurship education needs - in terms of programs, activities, or projects - to be successful in a career from the point of view of the undergraduate. Using data collected from 3,420 university students in more than ten countries, Dabic et al. (2012) examined the differences between the sexes and the different intentions.

3.2.2 Cluster 2: the role of the university

This cluster (yellow) focuses on the role of *universities* in student entrepreneurial choices. Entrepreneurship education should be based on entrepreneurship theory and implemented in student-centered learning activities. Hence, for this reason, the role of universities is important in stimulating student entrepreneurship (Forsström-Tuominen et al., 2015).

Several scholars have focused on the university's role in supporting student entrepreneurship. For example, Pizarro Milian & Gurrisi (2017) have empirically examined how entrepreneurship education is marketed to students in the Canadian university sector. In addition, Abou-Warda (2016) developed a framework for technology entrepreneurship education within universities from three aspects. Technology entrepreneurship professors, educators, technology entrepreneurship programs or courses, entrepreneurship education, and universities can equip students with entrepreneurial skills and prepare them to engage in entrepreneurial activities. Also, universities offer entrepreneurship education courses. However, the growing number of studies on the impact of entrepreneurship education courses offer conflicting and apparently contradictory results. For this reason, Han et al., (2020) underline the need for further studies on the topic.

3.2.5 Cluster 5: The role of entrepreneurial programs

The fourth cluster (violet between yellow and red) is the smallest; it includes papers that empirically analyze the *impact* of entrepreneurial programs on student entrepreneurship.

In particular, Kassean et al., (2015) explore the impact of common undergraduate entrepreneurship classroom activities on students' motivational processes related to entrepreneurial careers in the US. Karimi et al., (2016) explore the impacts of elective and compulsory entrepreneurship education programs on students' entrepreneurial intention and identification of opportunities in Iran.

Vanevenhoven & Liguori (2013) analyzed data-driven insights into the impact of entrepreneurial education on (1) both the motivational processes underlying students' road to entrepreneurship and through the entrepreneurial process and (2) the process of identity transformation from student to entrepreneur.

3.2.3 Cluster 3: The role of personality

Several authors have investigated the factors that influence entrepreneurial intention (Scott & Twomey, 1988; Kolvereid, 1996) and in particular, entrepreneurial attitudes by identifying different approaches

(Majumdar & Varadarajan, 2013). In the functional approach (Baumol, 1993), the entrepreneur is described as an innovator, and in the psychological approach, (McClelland, 1961) the entrepreneur is defined by his or her personality, motivations, and behavior. Accordingly, the interaction of personal characteristics (risky, creativity, and need for achievement) with perceptions of competencies and familiarity (entrepreneurial experience, knowledge, awareness, and interest) become critical to assess the students' entrepreneurial potential.

Studies in this cluster (blue) seek to establish causal relationships between psychological (the propensity for students to undertake an entrepreneurial study with the purpose of starting a new venture), demographic (with particular emphasis on age, gender, work experience, awareness, and their entrepreneurial experience), and behavioral factors (the *personality* traits of the individuals with the intention of measuring their creativity, risk-taking attitude, passion or need for achievement).

In particular, (Westhead & Solesvik, 2016) have shown that the ability to perceive risk is lower in female students and higher in male students.

3.2.4 Cluster 4: the role of perceptions

The papers in this cluster (green) identify the challenges and opportunities for improving higher entrepreneurship education by considering students' perceptions of both their demand for entrepreneurship education and their entrepreneurial intention.

Barba-Sánchez & Atienza-Sahuquillo (2018) indicated that the need for independence is the key factor in the entrepreneurial intent of future engineers and confirmed the positive contribution that entrepreneurship education has on their entrepreneurial intentions.

Egerová et al. (2017) adopted a mixed-methods study by investigating the perceptions of business students in the Czech Republic towards entrepreneurship education, and examining the factors influencing their level of intention to be entrepreneurs. The results indicate that family background significantly influences the student's entrepreneurial intention and that participation in entrepreneurship-oriented courses positively influences the student's level of self-efficacy. The study showed further that business education had some effect on the student's ability to gain the necessary knowledge for entrepreneurship. Another key finding was that entrepreneurship education specifically for business students has to equip students with entrepreneurial skills, attributes, and behaviors. The results also suggest that entrepreneurship education is a contextually determined concept that requires modification of content and methods to meet the specific needs of a particular target group.

4. Discussion

When examining the literature on student entrepreneurship, two distinct strands of research emerge.

The first focuses on an *exogenous approach*, emphasizing the role of institutions and the paths that encourage the start of an entrepreneurial path. In particular, the student entrepreneurship analyzes (1) the role of *entrepreneurship education* across the multitude of institutions that offer entrepreneurship education (e.g. Peterman & Kennedy 2003). Although current research shows both positive results (Fayolle et al., 2006; McMullan et al., 2002; Peterman & Kennedy 2003; Souitaris et al., 2007) and negatives (Von Graevenitz et al., 2010), universities around the world employ a combination of initiatives to create entrepreneurial appeal climate. More concretely, university offers of training and support for entrepreneurship are of different types (Feola et al., 2020; Matt & Schaeffer, 2018; Parente et al., 2015). The university can stimulate and facilitate innovative entrepreneurship through practical entrepreneurship activity (Feola et al., 2020; Kassean et al., 2015), specific educational programs, or technology transfer offices. In particular, *technology transfer offices* are particularly able at assisting researchers and students who wish to transfer the results of their research to business (Passarelli & Costabile, 2014; Boh et al., 2016 Hockaday &Piccaluga, 2021).

Within the exogenous approach, a second (2) part of the literature focuses on innovation intermediate. More tangible support can also come from public infrastructure to support entrepreneurship, such as incubators or proof of concept centers (Passarelli et al., 2020), and successful entrepreneurs serving as mentors. What Kenney and Patton (2005) called "entrepreneurial support networks" (e.g. actors as venture capitalists, lawyers, and accountants) are also formal institutions assisting the formation and growth of entrepreneurial firms. Informal institutions include the wider culture (Stephan & Uhlander, 2010) and social norms (Webb et al., 2009).

Table 1 - research approach and research topic on student entrepreneurship

Research approach	Research topic	Research stream
Exogenous	University ecosystems	• entrepreneurship education program (Battaglia et al., 2022; Kassean et al., 2015; Karimi et al., 2016) • Entrepreneurship activity (es. competitions) (Kassean et al., 2015); • Technology Transfer Office (Boh et al., 2016)
	Innovation intermediaries	• Incubators (Jansen et al., 2015); • Venture capital (Kenney & Patton 2005) • Informal institutions (Stephan & Uhlander, 2010) Proof of concept centers (Passarelli et al, 2020))
Endogenous	Personality	• Personal traits (Göksel, 2011; Cunningham & Lischeron, 1991) • Entrepreneurial spirt (Farrukh et al., 2018); • Creativity (Gustiawan, 2014); • Gender (Westhead & Solesvik, 2015; Zhang et al., 2014; Petridou et al., 2009) • Self-efficacy (Nowiński et al., 2019)
	Personal Background	• Ability (Huber et al., 2014); • Demographics (Laspita et al., 2012; Zellweger et al., 2011) • Social capital (Guerrero et al., 2008)
	Behavioral Theory	• Entrepreneurial Intention (Covin & Slevin 1989; Kraus et al., 2012; Rigtering et al., 2014; Krueger et al., 2000; Werner et al., 2014) • Entrepreneurial attitudes (Lüthje & Franke 2003; Majumdar & Varadarajan, 2013)

The second strand of research on an *endogenous approach.* Behaviors consist of actions performed with the influence of personal and external conditions (Le Thuy et al., 2020)s. In line with psychological theories of behavior formation, such as the theory of planned behavior, one can evaluate the social subgroup of students with their intentions towards entrepreneurship. Hence, their entrepreneurial behavior is derived from their attitude towards entrepreneurship. Thus, there is not spontaneity but intentionality in the actions to start a new venture (Ajzen, 1991; Kautonen et al., 2013).

The future entrepreneur will be a student with a genuine desire for a particular project; one who will put in place everything possible to their intentions and thoughts into action. Related to this is a particular behavior regarding discovery, evaluation and exploitation of an opportunity that can turn into a solid reality (Shane & Venkataraman, 2000; Krueger et al., 2000).

However, to study the process of business creation by students, there is a need to focus on the entrepreneurial spirit that characterizes the personality and attitudes of the student. In fact, skills and personal characteristics are at the basis of the entrepreneurial intention, accompanied by the desire to improve more and more, so that they can create business through

constant learning (Farrukh et al., 2018). However, it was also analyzed the entrepreneurial orientation was characterized by subjects who have a particular propensity to be competitive, innovative, proactive, risk-taking, and autonomous (Covin & Wales, 2012; Lee & Peterson, 2000). The latter may also characterize students who precisely are interested in the category and intend to be part of it. Taking the Personal Preference Schedule (Edwards, 1954; 1959), one of the first tests of entrepreneurial nature was asking the respondent to rank their needs. It showed that entrepreneurs have "a high need for success, autonomy, change and a low need for affiliation." However, even in reference to other more recent tests, very few mentioned student entrepreneurs and many concluded that entrepreneurship is influenced by many different factors (Tong et al., 2011; Van der Zwan et al., 2016). With reference to more general studies, there are studies that also point to the fact that a large proportion of the population would like to pursue an entrepreneurial career at a young age. It turns out that student entrepreneurship is very important for research on entrepreneurship, as it refers precisely to that stage of life. On the other hand, regarding gender, despite the growth in recent years, there are still many more male entrepreneurs than females, and there is a need to assess gender differences in the analysis of entrepreneurial intention and subsequent transformation into behavior (Zhang et al., 2014; Petridou et al., 2009).

Nielsen & Lassen (2012) stated that students are the perfect group to investigate identity construction in the entrepreneurial process. However, most of them believe that in order to be successful entrepreneurs, it is necessary to engage with an innovative or creative business plan. Lack of good planning can be problematic when starting a business, while a well-organized business plan can ensure the outcome of the project over time (Ferreira et al., 2017).

Seeking creativity could lead, in the long run, to a major transformation of society and help overcome some social challenges. In addition, innovation, motivation, and personal attitudes can be critical success factors and make you attractive to those considering this career option. While misperceptions about entrepreneurship, lack of skills, experience, or elementary knowledge about business can turn students away from engaging in entrepreneurial ventures (Jansen et al., 2015). Young students need to have the understanding that they do not have to master every possible skill to start or run a business. Personality traits play an important role, which is defined as "the ability to renew, increase and adapt skills over time" (Cunningham & Lischeron, 1991). That being said, students would come across as more flexible, able to acquire dynamic skills, and are not as emotionally attached to their business as most experienced entrepreneurs with great adaptive skills to their business model (Göksel, 2011).

Entrepreneurship is based on economic theory and the exchange of goods and services, and economic factors are crucial to the effective exercise of entrepreneurial activity. To it, it is also important to link the sources of funding for the business idea. In fact, the lack of funding for start-ups is one of the most important factors for young students trying to create a new business. Entrepreneurs need funding to achieve their goals and, especially, to grow their idea more and more (Alsos et al., 2016; Finkle et al., 2013; Wright et al., 2017)

Linked to purely economic factors, certain components influence people's lifestyles. In fact, sociological factors refer to the latter and characterize how individuals live their lives, their work, and their consumption habits. All within a cultural context, it is defined as a set of common values, beliefs, and expected behaviors. These can influence the intentions and behaviors of young students particularly towards organizational culture (Mars, 2009; Hahn, 2020).

Another important factor is related to the the role of students' parents. There are several evidence in the student's entrepreneurship literature that students with a family business background enhance their propensity to turn these intentions into actual behaviors (Hussain et al., 2021; Laspita et al., 2012, Zellweger et al., 2011). The family experience of parents has a significant impact on the entrepreneurial intentions and behavior of children (Shirokova et al., 2016). In addition, students with good family backgrounds in entrepreneurship are likely to take advantage of their knowledge and parental network when trying to start a new business and demonstrating some starting inequality for those without entrepreneurial family backgrounds (Hussain et al., 2021; Van Auken et al., 2006). Although with equal levels of intention and desire towards entrepreneurship, they do not benefit from this variety of resources, thereby making the transition from intention to actual behavior more cumbersome in some cases. As for the field of education, perhaps the closest to students, there are several methods that are grouped under entrepreneurship education defined as all activities that promote entrepreneurial attitudes, mentality and skills, and accompany the student from idea generation to start-up, growth, and real enterprise (Smith et al., 2006). The goal of entrepreneurship education is to try to get into the minds of students by using skills in a way that supports them in innovative activities or in taking risks resulting from the activity (Jones et al., 2017). In evaluating the effect of entrepreneurship education, it is useful to focus on learning in terms of intentional, cognitive, and skill-based outcomes (Huber et al., 2014). Indeed, if there are changes in attitudes in terms of wanting to start a new business or being involved in innovation within an existing business, there is some positive effect in terms of entrepreneurship education (Kyro, 2008). However, there is also a need to evaluate the understanding of the information obtained about the

reasons to start a business and the acquisition of the tools needed to be an entrepreneur. In particular, university initiatives, which aim to discover and strengthen the entrepreneurial spirit, facilitate the formation of positive beliefs about entrepreneurial careers among students. In other words, promoting entrepreneurship also creates a supportive atmosphere in terms of entrepreneurial intentions within universities, which can create a favorable environment for intention-action transformation (Battaglia et al., 2022; urker & Selcuk, 2009; Liñán et al., 2011; Sesen, 2013).

In recent years, the role of the professor has changed with the advent of technologies and devices that allow unprecedented access to data anywhere, and that has changed the way people teach and learn. Students are allowed to access knowledge and learn from any geographic location, which has created a digital learning ecosystem on entrepreneurship education including through free online courses (Liguori & Winkler, 2020).

5. Conclusion

Our study is one of the first to apply bibliometric analysis with statistical software to the topic of student entrepreneurship. More concretely, in this study, we superimpose the analysis of co-citations and bibliographic coupling analysis to discover what the most relevant research topics on student entrepreneurship are.

Our study contributes to the literature on student entrepreneurship in three ways. First, the analysis of Co-Citation identifies consolidated trends in the literature and their effect on the creation of new businesses. Specifically, from the analysis, three main clusters are derived; the behavioral planned theory, the educational paths, and some demographic aspects. This implies that most of the theoretical and managerial research are mainly focused on behavioral aspects that aim to investigate the behaviors of entrepreneur students on educational paths and in particular, on studies that aim to investigate the contributions of educational paths and their role in the development of the student entrepreneur and finally on the demographic aspects, and in particular on the demographic aspects that influence the choice of students to start an entrepreneurial activity.

Second, through the Bibliographic Coupling analysis, it is possible to identify emerging trends and future research trends (Egghe & Rousseau, 1990; Kessler, 1963). In particular, through the analysis of the bibliographic correspondence, the main research trends have been identified. More concretely, some trends focus on *entrepreneurial intent* and in particular on the elements that push the students' intentions to start an entrepreneurial path by privileging empirical analyzes to theoreti-

cal ones (Battaglia et al., 2022; Parente & Feola, 2021). Another trend focuses on the effect of *micro factors* that influence entrepreneurial intentions and in particular on the psychological factors that push students to start an entrepreneurial path (Gupta et al., 2009; McGee et al., 2009; Ahmed et al., 2010). Finally, another big trend concerns the *macro factors* that influence students' entrepreneurial choices (Da Silva et al., 2015; Galvão et al., 2018; Pittaway & Cope, 2007). The result of the analysis of the two methods is in Table 1.

Our study, in fact, offers some policy implications. Specifically, policymakers should enact specific policies to support academic entrepreneurship initiatives. Also, government can conduct both active and passive policies to encourage entrepreneurship. Since the characteristics of the ecosystem inevitably influence entrepreneurial choices, public policies should be supporting the creation of incubators that can be a support for the potential entrepreneur. In fact, they can acquire managerial insights to supplement their technical expertise to help gain familiarity with customers and suppliers while on someone else's payroll. The networks the entrepreneur develops are bound to the environment of the incubator organization so that when he/she starts up a venture, it tends to be in the same area. Moreover, public policies should be oriented to expand the funding system for students, enact laws to help students easily access capital, promote and encourage investment activities of large companies in startups. The costs of starting a business is another factor that policymakers should consider. Such costs are certainly a factor one considers before embarking on any entrepreneurial activity. Start-up costs include the number of procedures and days it takes to form a business entity, the fees required to establish a business, and a minimum level of required capital. Also, legal protection and property rights represent important factors to regulate. All these factors are important for generating an entrepreneurial-friendly environment for students.

These considerations provide new insights into the influence of universities on promoting the development of the student entrepreneurship. More concretely, the identification of micro and macro factors encourages universities to initiate increasingly specific and focused educational paths also for the development of personal skills and abilities (e.g. soft skills).

In addition, universities could further define their strategies to encourage and help start and develop new businesses during their studies. In particular, universities should actively involve their technology transfer offices during the studies of aspiring entrepreneurs (Passarelli et al., 2020).

Finally, an important perspective to note concerns the motivation behind students' career choices. In particular, young graduates may interpret entrepreneurship as one of the only choices for employment. In other words, this aspiration is not based on their actual characteristics or intentions but is a direct consequence of the unstable macroeconomic conditions in which they live, which is characterized by high youth unemployment. In this context, universities, industries, and policymakers, in general, should work together so that there is an appropriate alternative job offer to entrepreneurship. In fact, only in this way would entrepreneurship become a chosen and undue path.

However, it is not without limitations. First, the main limitation deals with the fact that labels of clusters emerging from co-citation analysis and bibliographic Coupling analysis are the result of the authors' elaboration. As consequence, similarities/differences with previous works could be formal and/or consistent. Second, our study only considers the last 10 years of research. However, this was a choice of the authors to limit the field of investigation. Third, only articles in English were considered for the authors' skills.

6. Implications and Future research

Our study offers insights for future research in the field of student entrepreneurship. First, our study analyzed the different research fields emphasizing the role of entrepreneurial education. Indeed, although some studies have focused on the empowerment and engagement of technology transfer professionals (Cucino et al., 2021a), future research could investigate the drivers of empowerment and engagement in entrepreneurship education. In other words, a possible research trajectory can look at the factors that stimulate the creation of a business with or without academic involvement. This could help examine the actions taken by universities and the factors that contribute specifically to the creation of academic spin-offs. Through the study and its implications, universities could define in more detail their strategies for the entrepreneurial university to encourage and help start and develop new businesses during their studies.

Second, our study highlighted the role of the university in delivering entrepreneurial pathways. In fact, several studies have focused on the role of the entrepreneurial university (Feola et al., 2020; Grimaldi et al., 2021; Parente & Feola, 2021; Sedita & Balsi, 2021), focusing either on technology transfer activities (Abreu & Grinevich, 2013; Miller et al., 2018), education activities (Han et al., 2021), or university start-up competitions (Parente et al., 2015). Further investigation could also look at the actual output of entrepreneurship education in terms of the creation of new businesses by students participating in the courses.

Third, our study highlighted the main endogenous factors underlying student entrepreneurship. In particular, several scholars have focused on the role of the entrepreneurial spirit (Farrukh et al., 2018), creativity (Gustiawan, 2014), and self-efficacy (Hussian et al., 2021; Nowiński et al., 2019). However, future studies could investigate whether there is a behavioral transformation in students who have started businesses in terms of their approach to work and of personal and behavioral characteristics.

Finally, our study focuses on students' individual intentions. According to our analysis, several studies have analyzed the impact of family background and personality traits on entrepreneurial intentions (Cunningham & Lischeron, 1991; Göksel, 2011; Hussian et al., 2021). Future research should analyze group intentions since students usually belong to groups in both university and out-of-school settings. Thus, in the assessment of personal conditions and consequences, although the underlying cognitive mechanisms are individual, the different processes from initiation to daily activities occur in teams, which justifies the need to investigate group processes. Further research will focus also on biological factors (Passarelli et al, 2020), by combining biology and entrepreneurial behavior among students. A recent field of literature, in fact, focused on the relationship between hormones, physical characteristics, health conditions and entrepreneurial dimensions. The stimulation of such hormones among students could help them to increase their alertness, their motivations, and their entrepreneurial orientation.

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