Academic Entrepreneurship: A Systematic Review of Literature

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Abstract – Academic entrepreneurship has received a lot of attention in the academic community and policy makers. The underlying objective to present study is to conduct the systematic literature review on academic entrepreneurship and its role in developed and developing countries. Total of 523 papers were retrieved either from Scopus or Web of Science databases, after considering the inclusion and exclusion criteria, total 146 papers were considered for the current study. Full papers were studied be three independent researchers to prepare this review paper and not just merely focusing on the abstracts. The findings of present study reveal that the definition of academic entrepreneurship is still unclear and most of the studies are from developed economies and so far, literature in unable to consider the effect of research ambidexterity among the individual faculty members. The findings of present study will facilitate the academicians, researchers, universities, and policymakers in understanding the role and significance of academic entrepreneurship.
Keywords: “exploration”, “exploitation”, “ambidexterity”, “academic entrepreneurship”, “climate”.

1. Introduction

Academic entrepreneurship (AE) has received a lot of attention in the academic community and policy makers (Teixeira & Nogueira, 2016), where it is seen as an important part of the transition to knowledge creation (Audretsch & Lehmann, 2006; Rothaermel et al., 2007; Teixeira & Nogueira, 2016). AE encompasses activities such as “university-industry research collaborations, patent applications, idea spin-offs into new businesses, high-skilled entrepreneur education, and business incubators” (Shane, 2004; Somsuk & Laosirihongthong, 2014; Siegel & Wright, 2015).

Recent literature affirms that AE is vital towards the employment generation and economic growth. Policymakers and academic institutions in developed economies have invested heavily in initiatives to commercialize academic research, which is unsurprising (Centobelli et., 2019; Link et al. 2014). Universities' management is increasingly emphasizing "impact" as one of their overarching goals. It is still unclear how effective and efficient commercialization initiatives to support AE are at boosting knowledge

transformation, innovation, employment generation, and economic growth. However, literature about factors influencing the academic entrepreneurial intentions among faculty members are limited and to investigate what factors have already been explored there is a need to perform systematic literature review. Based on the selection of ad hoc literature, a rigorous method of review is systematic literature review (SLR). The SLR facilitate in extracting all the existing literature on research question; the findings of SLR facilitate academicians, practitioners, and policymakers.

The main problem area pertinent in literature is that factors that link the ambidexterity to academic entrepreneurship are not listed as yet. Our literature review has two primary objectives in the context of our study. The first step is to review prior research in the area of interest and pinpoint any pertinent trends, problems, or themes. The second involves outlining all pertinent research contributions to the topic in order to suggest a conceptual framework and a tactical strategy. The accomplishment of the aforementioned two goals enables us to identify research gaps and choose research hypotheses that will be investigated in further empirical studies. In order to accomplish these goals, this study creates the concept of university ambidexterity to examine the development of entrepreneurial institutions.

This paper will share the SLR from a study investigating AE and intentions of individual faculty members towards AE. This paper comprises five parts, starting from introduction, followed by explanation of the methods for systematic literature review, descriptive analysis, results, and conclusion. The next section discussed the SLR findings and ends with directions for future research.

2. Methods

Various methodological frameworks have been developed in social sciences to carry out a systematic review of literature (Tranfield et al., 2003; Pittaway et al., 2004; Petticrew & Roberts, 2006; Pittaway et al., 2011; Easterby et al., 2012; Centobelli et al., 2017).
The systematic approach to review literature introduced by Pittaway et al. (2004) can be referred to as a step-by-step method, which usually involves the recognition of keywords and standardization of search terms, the assessment of references, the categorization of publications into three lists in line with their emphasis and, finally, the presentation of thematic analysis. Moreover, Petticrew and Roberts (2006) identified some of the drawbacks of the traditional literature review and recommended a more systematic method that draws attention to selection criteria, makes a strong distinction between exclusion and inclusion criteria, reviews and incorporates the submissions and disseminates the conclusions of the study.

Jones et al., (2011) used a review approach, which was structured into four specific processes: preparing, performing, evaluating, and coordinating the study. In contrast, Easterby et al., (2012) portrayed two key mechanisms for carrying out a comprehensive analysis (i.e., identifying the research procedure and drawing up the related studies on the subject).

According to Centobelli et al. (2017) and Tranfield et al. (2003), we use a systematic review procedure rather than alternative survey or review approaches to find, evaluate, and synthesize all pertinent papers. This ensures that the process is visible and repeatable for future researchers. Instead of using automatic screening, this method is appropriate for literature studies on qualitative subjects since it gives an in-depth grasp of qualitative features. Following Jones et al. (2011) methodology the combined inductive and deductive strategy was used in this study to determine the research areas where theoretical and content analysis would be conducted. First, publications were sorted and categorized into several literature categories by two researchers working concurrently, with a third researcher added in cases of doubt. Researchers were selected based on their prior familiarity with the context and theoretical description of the primary literature categories.

This analysis is based on the complete manuscript and not only on the evaluation of the abstract or a few selected paragraphs. According to Mayring (2000), Krippendorff (2013), and Centobelli et al. (2017), the researchers evaluate whether the identified literature categories are exhaustive to completely capture the nature of the scientific literature and, if necessary, include additional categories after reading and categorizing the 25% of the papers and using the inductive category development procedure. As a result, we inductively constructed the final list of subject areas from the articles using theme coding techniques from qualitative research (Thorpe et al., 2005). Once 50%, 75%, and 100% of the chosen papers have been examined, the same process is repeated. This is an iterative process based on the identification and verification of the validity and consistency of the identified literature categories.

To achieve the objective of investigating AE and intentions of individual faculty members towards AE, the SLR adopted for this paper can be divided into two main phases:

2.1. Phase 1: Article Selection

The underlying objective of present study to explore the factors influencing the academic entrepreneurial intentions among the faculty members. To achieve the research objective present study considered to choose the rigorous method of systematic review of literature. Various methods earlier have been documented in literature on the process of systematic literature review. The present study considered the step-by-step approach that starts with recognition of keywords, standardization of search terms, and categorization of publication (Pittaway et al. 2004; Jones et al., 2011). Article selection involves two steps.

Step 1

In this phase extensive content searches were done using a set of common keywords and clusters. The research articles were then sorted through defining the criterion for exclusion/inclusion, upon which the research articles were chosen.

Table 1: *Content Search*

Range of years	Published from 1990 to 2016	Published from 2017 to 2020
Database: Scopus	264 hits	-
Database: Web of Science	234 hits	168
Total clicks retrieved in both databases	498	-
Same papers	133	-
Number of clicks excluding same papers	365	
Not accessible	-	10
Total	**365**	**158**

In consideration of the work being done by an entrepreneurial institution, papers lacking an emphasis on this topic are omitted. In order to accomplish this goal, the method suggested by Pittaway et al. 2004; Thorpe et al. 2005; Petticrew & Roberts, 2006; Centobelli et al., 2017 has been followed. Thus, two requirements for including / excluding articles are listed as illustrated in Table 2, which focuses on research outputs that are nearest to the subject under enquiry. Table shows the distribution of 523 articles published on the topic from the year 1990 to 2020. This systematic literature review is the extension of the already published literature review on the same topic. The first exclusion criteria analyse the articles in accordance with their analytical orientation. Abstracts were reviewed separately by two researchers and in case there was a confusion third researcher was involved. In keeping with the first criteria and considering the nature of this work, 158 publications have been published from 2017 to February 2020. The focus of the paper was taken into consideration as the second criterion of exclusion. For this purpose, three reviewers have read the full text of the papers. This process helps us to classify 34 non-research-related papers. Due to the second criteria, 58 publications were included (Centobelli et al., 2017). Ten articles appeared in the research were not accessible.

Step 2

This part describes the findings of the above-described procedure for evaluating literature and its purpose is to scan and pick the articles to determine the total number of the articles to be used in this review. For establishing rigor and to obtain comprehensive content the data was obtained from two top databases that is “Web of Science and Scopus”. The articles were extracted till March 2020 and hence the timeframe taken into this analysis is from 1990 to February 2020.

A specific condition of keywords like “third mission” or “entrepren*” were utilized including “universit*”. Selection method was confined to peer-articles published in

journals and written in English by scholars and professionals alike (Thorpe et al., 2005; Podsakoff et al., 2005; Gunasekaran et al., 2015). Selected articles were either philosophical, quantitative or qualitative studies. Originally, a total of 168 hits are contained in the repository from 2017 to 2020 as seen in Table 1.

The first exclusion criterion examines the papers in light of the focus of their abstracts. Two readers have independently read each abstract, with a third reader added in situations of doubt. 253 papers have been included in this study in accordance with the first criterion and taking the size of the study into account.

The article's emphasis is taken into consideration by the second exclusion criterion. Three scholars have read the papers' whole for this purpose. We found 115 articles that are not relevant to the study topic. 138 articles have been included that meet the second criterion.
The third inclusion criterion is a validation criterion that is frequently employed in structured literature reviews to locate and recover pertinent publications that were mentioned in the body of the literature but could not be located using the databases, time range, and keywords that were chosen (Centobelli et al., 2017).

For the articles that could not be retrieved from the research repositories by three independent researchers were requested from University of the Punjab librarian to help us in retrieving them. There were 10 articles which could not be accessible and hence were excluded from the study.

Since those contributions were listed in the literature, eight more have been added. Consequently, 146 papers are examined in the next stage of descriptive analysis.

Table 2: *Parameters for inclusion/exclusion*

		Included Articles	**Excluded Articles**
Parameter 1: Abstracts emphasis	Abstracts that has entrepreneurial university as the main emphasis	253	270
Parameter 2: Emphasis of the articles	Articles that has entrepreneurial university as the main emphasis	138	115
Parameter 3: cited references	Articles that were cited in the area of entrepreneurial university but were not retrieved in the first step	08	00
	Total number of articles	**146**	

2.2. Phase 2: Article Review

At this stage, articles were being reviewed for their theoretical, conceptual, and material focus.

Conceptual assessment and categorization of papers by which papers were categorized in accordance with the descriptive aspects identified. Text and theoretical review in which selected papers have been categorized in accordance with their theoretical comparison model and content.

Preliminary to the phases, the present study uses a mixture of methods, as proposed by Tranfield, et al., (2003) and Centobelli et al., (2017), by means of a systematic review method, to find, analyze and consolidate all related articles using a robust and consistent framework to ensure replicability for further studies. In this article, as described by Jones et al., (2011), mixed approach using both deductive and inductive methods is adopted to identify study areas for conceptual and material analysis. In step number one, the papers were evaluated and classified into various categories of literature by two researchers and a third in the case there was any confusion. Researchers were selected based on their experience with the meaning and analytical understanding of main categories of literature. The articles were read in detail and were not classified only based on abstracts.

As shown by Mayring (2000); Centobelli et al., (2017); and Krippendorff (2013) after reviewing and classifying 25 percent of the publications by utilizing the inductive category formation method, researchers decide if the categories of literature listed are exhaustive and if required additional categories were included. Based on the thematic codes complete list was formulated from the qualitative articles that were retrieved. When the 50 percent, 75 percent and 100 percent of the papers selected are tested, the same procedure is repeated. It is an iterative approach that focuses on identifying and checking the consistency and reliability of the types of literature described.

The methodology discussed above is used in the preceding two sections to offer a detailed description of the subject of entrepreneurial universities. In brief, the details of the first paper collection process are laid out in Part 3, while Part 4 describes the major findings of the chosen papers in terms of the descriptive, analytical, and material analysis in addition to that part 5 explain the selection of papers while a SLR reported in part 5, 6, and 7.

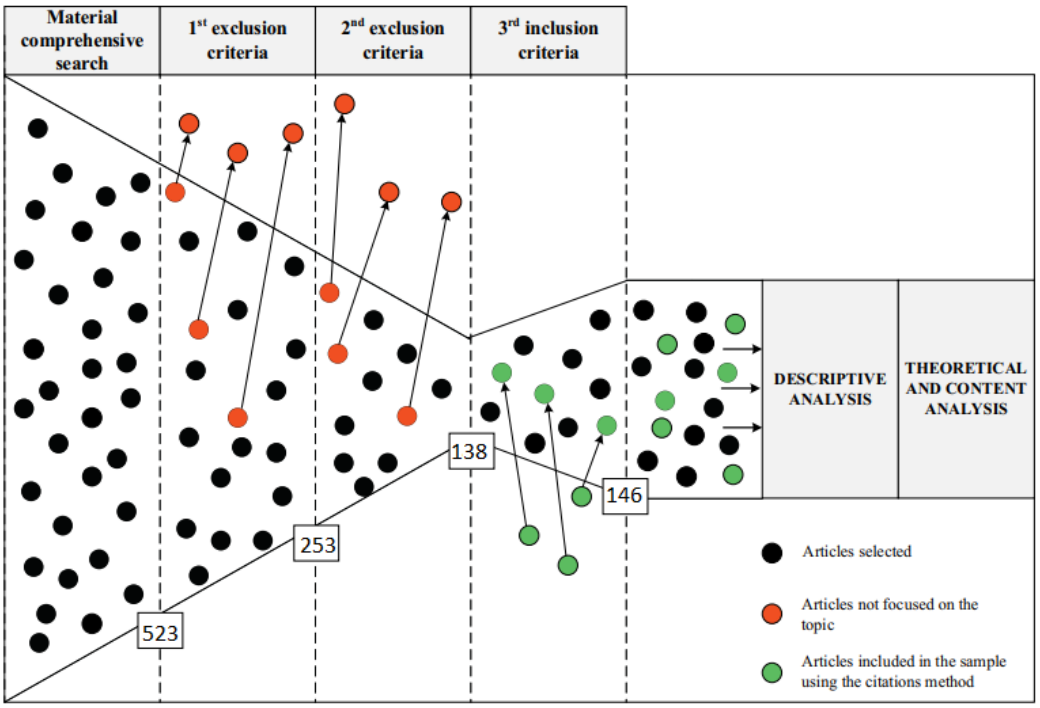

Fig 1: Literature Review Funnel

3. Findings of the Descriptive Analysis

Before further reviewing their contents in detail, researchers carried out descriptive analysis in order to examine the chosen articles. The following four descriptive points of view are established for the review of selected papers: Methodology-wise, Journal-wise, Year-wise, Authors' country of origin-wise.

3.1. Methodology-wise

As far as the research approach adopted is concerned, most publications selected are conceptual papers (41) and case studies (16). Conceptual articles are grounded on preceding theoretical models and does not have any empirical evidence. The pure quantitative articles were 14 in numbers are mostly data is collected through surveys and databases. There are 3 papers (case study / Semi-Structured Interviews / survey) based on a mixed approach. There are also eight qualitative articles that collected data through structured and semi-structured interviews. The tendency towards triangulation has been increased since 2016 as it facilitates the validation of data.

3.2. Journal-wise

Journals of relevant articles are analysed and fourteen subject area in which most of the articles are published are noted: “Strategic Entrepreneurship Journal”, “Management Decisions”, “Technological Forecasting & Social Change”, “Higher Education Quarterly”, ”International Entrepreneurship and management Journal”, “Technovation”, “Sustainability”, “International Journal of technology management”, “Journal of

Entrepreneurship in Emerging Economies", "Scientometrics", "Journal of Management Development", International Journal of Entrepreneurial Behavior & Research", "Administrative Sciences" and "International journal of technology management". A variety of journals dealing with various subject areas (i.e., strategic entrepreneurship, management, science, and technology) have published papers on the topic under review. It is concluded that most of the papers have been published in the journal of "Technology, Management and Entrepreneurship" and "Social Sciences".

3.3. Year-Wise

According to the year-wise distribution of articles, most articles (118) are published in 2017-2018 and 91 articles from 2019-2020. The first ground-breaking paper attempts to identify an entrepreneurial university and tries to examine the basic essential success factors whilst the latest research contribution have begun to discuss the possible effect of an entrepreneurial university on the growth of the regional innovation ecosystem and societal development. Recent contributions to the subject thus stress modern areas like the involvement of industries with universities to make them entrepreneurial.

Table 3: *No of publication year-wise*

Year	No. of Publications
2019-2020	91
2017-2018	118
2016	21
2015	12
1997-2015	32

3.4. Authors' country of origin-wise

Majority of the articles published between 2017 to 2020 were by European researchers and mostly from Italy.

The analysis also reveals that till 2016 it was the idea led by USA which after 2016 has been take up by European countries. Some papers were by the individual authors from other countries examples include from Brazil, Japan, China, Lebanon, Pakistan, India, Turkey, Mexico, Australia and South Africa. In addition to this, some papers have been published by researchers belonging to different countries i.e.UK/Russia, Brazil/The Netherlands, UK/Germany, Iran/Macedonia, Spain/UK, Italy/India.

4. Findings from the Systematic Literature Review

Various conceptual frameworks have been formulated in the literature to demonstrate the developments of university entrepreneurialism (Table 4). According to Etzkowitz and Leydesdorff (1995) the work from 1990's to early 2000s mainly used triple helix model, Clark,1998 theory of entrepreneurial pathways of transformation and Sporn,1999 theory of adaptation.

Table 4: Taxonomy of Entrepreneurial Universities

Area of focus	*References*
Taxonomy of entrepreneurial university definitions	Etzkowitz (2003 [a]), Mueller (2006), Gibb and Hannon (2006), Guerrero et al. (2008), Chang et al. (2009), Siegel et al. (2007), Fayolle et al. (2010), Guerrero and Urbano (2012[a]), Etzkowitz et al. (2008 [a]), Budyldina, (2018), Markuerkiaga, Igartua, & Errasti, (2018), Posselt, Abdelkafi, Fischer, & Tangour, (2018), Kirby et al. (2011), Pugh, Lamine, Jack, & Hamilton, (2018), Marques, Oliveira, Andrade, & Zambalde, (2019), Moreno, Muñoz, & Morote, (2019), Ricci, Colombelli, & Paolucci, (2019)

The model of triple helix was developed by Etzkowitz, and Leydesdorff, (1990). This model examines how the interactions between universities, business and governments influences the social and economic development. In recent studies, the quadruple helix model is introduced which includes media and civil society as the fourth source of external influence (Carayannis et al., 2018; Allahar & Sookram, 2019; Marques et al., 2019; Bizri et al., 2019).

The main purpose is to close the gap so that innovations can result in better results for the society. Quadruple Helix Innovation Framework identifies four major players in the innovation system: technology, government, business, and community. In line with this pattern, more and more policymakers are giving preference to greater public participation in innovation processes. Through helical structure theory of innovation, each domain is defined by a circle (helix), with correlations showing overlap. The initial modeling has progressed from two dimensions, for instance over time, to demonstrate more complex interactions (Carayannis et.al, 2018).

Another theory has been widely used that is the knowledge spillover theory of entrepreneurship. It argues that the environment plays an important role in shaping entrepreneurial intent of academics. In fact, a knowledge-rich context creates entrepreneurship possibilities from these concepts. By commercializing innovations that have emerged from an existing institution through the establishment of a new business, the entrepreneur (human capital) not only acts as a driving force for the transfer of expertise, but also for the eventual growth of creative practices and increased economic efficiency through the redistribution of resources (Ahmad et al., 2018). The knowledge spillover theory of entrepreneurship integrates recent entrepreneurship theories and concepts with the existing theories of economic development, geography, and policy, and thereby demonstrates not only why certain people want to become an entrepreneur, but also why this is beneficial to the economy and society (Fuster et al., 2019).

The effects of the implementation of this process may be calculated taking into account the production and performance measurement of spin-offs and their spillover impact on the local innovation ecosystem (Vohora, Wright, & Lockett, 2004). In the area of entrepreneurial study at the university, Rothaermel and Hess (2007) presented a qualitative description of the research process evaluating the key internal and external influences influencing entrepreneurial development. External factors provide the circumstances of business and government policies, while internal factors include compensation programs, rank, technology, established position and reputation, society, administration, personnel, place, intermediary and expertise. Over the last decade, the literature seems to be affected by the argument on the transition of entrepreneurial universities into entrepreneurial institutions and the relationship between the outcomes of university entrepreneurialism and its mission (Freel et al., 2019; Baglieri et al., 2018; Meoli, et al., 2018; Mariani et al., 2018).

Academic Intellectual leadership (AIL) theory argues that professors have been turned into loosely defined entrepreneurs of expertise, and sometimes feel excluded or undermined by their own universities as leaders. Professors must balance the rights of academic freedom with the obligations of academic duty in order to fulfil their position. As critics and activists, they exercise their intellectual freedom, but they still need to be mentors, leaders, enablers, and representatives. This defines four orientations toward intellectual leadership: intelligence creator, academic resident, boundary transgressor, and public intellectual. Both orientations are demonstrated by reference to the professors' professions and demonstrate how to better recognize intellectual leadership as a transformative practice. This book addresses the question of what intellectual leadership really is, and analyses the issues most often associated with the role of senior academics (Uslu & Arslan, 2018).

Guerrero and Urbano (2012) theory included various factors such as formal-informal, external-internal which were also supported by resource-based view. Resource based view focuses on developing its human resources that cannot be imitated or replaced and acts as a source of competitive advantage (Guerrero et al., 2019). As for the university spin-off model, it focuses on tangible and intangible capital impacting the entrepreneurial operation of universities, calculated solely based on the number of spin-offs created in a year. Four separate types of tangible and intangible considerations are identified that includes administrative resources, intellectual capital, monetary resources and economic resources.

Lastly, the criteria for evaluating the effects of these variables are related to the three university missions i.e., teaching, research and entrepreneurship. Basically, it involves the study of competent academics, developing enabling environment that results in entrepreneurial activities. More precisely, it appears from the literature review that the climate of internal and external organizations affects the activities of the universities. Similarly, these practices impact entrepreneurial university output in order to achieve university’s three missions. Thus, deciding the equilibrium of these goals with the help of internal organizational climate and external environment helps the entrepreneurial institution to work as an efficient driver of social and economic change.

5. Findings of the SLR-Content Analysis Results

5.1 Articles by Topic Area

The papers were grouped according to four defined subject areas were reported in Table 4. "Categorization of university definitions of entrepreneurship" in which writers identify and assess the idea of university of entrepreneurship; 2. "Factors influencing the entrepreneurship at university" in which authors analyze critical organizational, administrative and associated factors related to the entrepreneurial activities of universities; 3. "Effects of business concerns on university function," in which academics explain how business oriented university growth influences conventional activities; 4. "Assessment of entrepreneurial university performance," in which writers analyze the key methods for estimating the university's performance. Table 5 illuminates that the literature has concentrated mainly on the "Factors that affect entrepreneurial universities" area, while the "Entrepreneurial University Efficiency Evaluation" area tends to be somewhat overlooked.

Table 5: Articles by topic area

Topic area	*References*
Factors affecting academic entrepreneurship	Gorman et al. (1997), Vickers et al. (2001), Etzkowitz (2003)[a], Lazzeroni and Piccaluga (2003), Rubino and Freshman (2005), Kirby (2006), O'Shea et al. (2007), Bramwell and Wolfe (2008), Etzkowitz et al. (2008)[a], Amiri et al. (2009), Carlsson et al. (2009), Atkinson and Pelfrey (2010), Nelles and Vorley (2011), Meyers and Pruthi (2011), Bodunkova and Chernaya (2012), Guerrero and Urbano (2012)[a], Louw and Moloi (2013), Urbano and Guerrero (2013), Guerrero et al. (2014c), Pinheiro and Stensaker (2014), Samandv and erSijde (2014), Blackmore and Sawers (2015), Callagher et al. (2015), Carayannis et al. (2015), Czarnitzki et al. (2015), Dabic et al. (2015), Ferreira and Steenkamp (2015), Guerrero et al. (2015), Joseph (2015), Kalar and Antoncic (2015), Lam and de Campos (2015), Mok (2015), Salamzadeh et al. (2015), Abesi et al. (2016), Ahmad et al. (2016), Bienkowska et al. (2016), Bikse et al. (2016), Brown (2016), Carayannis et al. (2016), Chang et al. (2016), Culkin (2016), Etzkowitz (2016), Guerrero et al. (2016a), Guerrero et al. (2016b), Hark (2016), Hayter (2016), Iscaro, Castaldi, & Sepe, (2016), McClure (2016), Reyes (2016), Sideri and Panagopoulos (2016), Soleimani et al. (2016), Striedinger et al. (2016), Leih and Teece (2016), Urbano, Aparicio, Guerrero, Noguera, & Torrent-Sellens, (2016), Brem, & Radziwon, (2017), Guerrero, Urbano, & Herrera, (2017), Jessop, (2017), Kalitanyi, & Bbenkele, (2017), Rhoades, & Stensaker, (2017), Wynn, & Jones,

	(2017), Unger, & Polt, (2017), Abdelkafi, Hilbig, & Laudien, (2018), Afsarb, (2018), Ahmad, Halim, Ramayah, Popa, & Papa, (2018), Ardito, (2018), Baglieri, Baldi, & Tucci, (2018), Bouncken, (2018), Carayannis, Grigoroudis, Campbell, Meissner, & Stamati, (2018), Clauss, Moussa, & Kesting, (2018), Dalmarco, Hulsink, & Blois, (2018), Davari, Emami, Ramadani, & Taherkhani, (2018), Fustera, Padilla-Meléndeza, Lockettb, & Rosa-del-Águila-Obraa, (2018), Fischer, Schaeffer, & Queiroz, (2018), Fleacă, Fleacă, & Maiduc, (2018), Uslu, & Arslan, (2018), Lahikainen, Kolhinen, Ruskovaara, & Pihkala, (2018), Mariani, Carlesi, & Scarfò, (2018), Martin, Warren-Smith, & Lord, (2018), Montiel-Campos, (2018), Sierra, & Villazul, (2018), Seguí-Mas, Oltra, Tormo-Carbó, & Sarrión-Viñes, (2018), Baumgartner, & Plakolm, (2019), Bizri, Hammoud, Stouhi, & Hammoud, (2019), Dolan, Cunningham, Menter, & McGregor, (2019), Fischer, de Moraes, & Schaeffer, (2019), Fantauzzi, Frondizi, Colasanti, & Fiorani, (2019), Freel, Persaud, & Chamberlin, (2019), Giones, (2019), Lombardi, Massaro, Dumay, & Nappo, (2019), Mascarenhas, Marques, Galvão, Carlucci, Falcão, & Ferreira, (2019), Pettersen, Kubberød, Vangsal, & Zeiner, (2019), Rippa, & Secundo, (2019), Rybnicek, Leitner, Pickernell, Ishizaka, Huang, & Senyard, (2019), Salomaa, (2019), Sánchez‐Barrioluengo, Uyarra, & Kitagawa, (2019), Skute, (2019), Yoshioka-Kobayashi, (2019), David, Jones & Dean Patton (2020)
Entrepreneurial university performance measurement	Mahdavi Mazdeh et al. (2013), Wang (2013), Deluyi et al. (2014), Gianiodis et al. (2016)

5.2 Articles by Learning Process-wise

Research papers were grouped relative to two defined types of learning process reported in Table 6 exploration and exploitation. The first group of articles have a focus on internal factors whereas second group focusses external factors that supports academic entrepreneurship. Both of the learning processes outlined above involve external and internal factors and their interaction towards making or impeding entrepreneurial orientation of university. March (1991) became the first to examine the association in 'Organizational learning theory' between the exploration of the external factors and exploitation of the internal factors. Exploration is specified as the process to comprehend the impact of external resources whereas, exploitation as a process of increasing and efficiently utilizing existing internal resources. Exploration and exploitation were examined different categories, including strategic management (Dalmarco et al., 2018; Liu

& Huang, 2018; Fischer et al, 2019; Pickernell et al., 2019), human resources management; (Uslu & Arslan, 2018; Rybnicek et al, 2019), and technology management (Pettersen et al., 2019; Jones & Patton, 2020).

Gupta et al. (2006) emphasized the difficulty of defining the distinctions between exploration and exploitation with respect to learning aspects. A large majority of papers concentrate on exploitation and exploration as strategic activities (Giones, 2019; Lombardi et al, 2019 ; Balasubramanian et al., 2020), mechanisms of learning (Rybnicek et al., 2019; Ricci et al., 2019), knowledge development and utilization (Centobelli et al., 2019), innovation strategies (Pettersen et al., 2019; Jones & Patton, 2020) and search processes (Qian et al. 2018; Rippa & Secundo, 2019).

Exploitation is defined as the organization of internal expertise, capital, research, teaching, and entrepreneurship. Second, we describe exploration as managing external expertise, resources, and skills to support conventional university operations, commercializing work, and other entrepreneurial implications. Such learning processes described are used to conduct our systematic analysis using theoretical perspectives according to the as described above. Taking into account the papers reviewed in this systematic analysis of university entrepreneurialism literature, Table 6 specifies that 44 academic papers incorporate the process of exploitation while 47 papers concentrate on the process of exploration. The papers that were generated under exploitation dealt primarily with internal factors of university; whereas external factors external to university and policy matters were discussed under exploration.

This article examines the policy factors for enhancing university entrepreneurialism. It should be mentioned that some specified papers concern with both the processes. Universities may generally be regarded as entities in the academic setting that can grasp on opportunities from external environment by strengthening their internal resources.

Table 6: Articles by type of learning process

Type of learning process	**References**
Exploitation	Gorman et al. (1997), Etzkowitz (2003), Lazzeroni and Piccaluga (2003)[a], Rubino and Freshman (2005), Kirby (2006), Mueller (2006), O'Shea et al. (2007), Siegel et al. (2007), Wang (2013), Bramwell and Wolfe (2008)[a], Guerrero et al. (2008), Chang et al. (2009), Atkinson and Pelfrey (2010), Fayolle et al. (2010), Kirby et al. (2011), Bodunkova and Chernaya (2012), Louw and Moloi (2013), Mahdavi Mazdeh et al. (2013), Urbano and Guerrero (2013 a), Deluyi et al. (2014)[a], Pinheiro and Stensaker (2014), Sam and van der Sijde (2014), Blackmore and Sawers (2015), Carayannis et al. (2015), Dabic et al. (2015), Kalar and Antoncic (2015), Lam and de Campos (2015), Abesi et al. (2016), Ahmad et

	al. (2016)[a] , Bienkowska et al. (2016), Chang et al. (2016), Gianiodis et al. (2016), Guerrero et al. (2016b), Gür, Oylumlu, & Kunday, (2016), Hark (2016), Khvatova, & Dushina, (2016), Leih and Teece (2016), Reyes (2016), Salamzadeh et al. (2016) Sideri and Panagopoulos (2016), Striedinger et al. (2016), Urbano et.al., (2016), Brem, & Radziwon, (2017), Kalitanyi, & Bbenkele, (2017), Kazin, Hagen, Prichislenko, & Zlenko, (2017), Kirs, Karo, & Lumi, (2017), McClure (2016), Kochetkov, Larionova, & Vukovic, (2017), Maritz, (2017), Trevitt, Steed, Moulin, & Foley, (2017), Unger, & Polt, (2017), Wynn, & Jones, (2017), Ahmad, Halim, Ramayah, Popa, & Papa, (2018), Baglieri, Baldi, & Tucci, (2018), Bouncken, (2018), Davari, Emami, Pugh, Lamine, Jack, & Hamilton, (2018), Ramadani, & Taherkhani, (2018), Errasti, Bezanilla, García-Olalla, Auzmendi, & Paños, (2018), Lahikainen, Kolhinen, Ruskovaara, & Pihkala, (2018), Fischer, Schaeffer, & Queiroz, (2018), Fustera, Padilla-Meléndeza, Lockettb, & Rosa-del-Águila-Obraa, (2018), Liu, & Huang, (2018), Markuerkiaga, Igartua, & Errasti, (2018), Martin, Warren-Smith, & Lord, (2018), Posselt, Abdelkafi, Fischer, & Tangour, (2018), Sánchez-Barrioluengo, & Benneworth, (2018), Seguí-Mas, Oltra, Tormo-Carbó, & Sarrión-Viñes, (2018), Uslu, & Arslan, (2018), Uslu, Calikoglu, Seggie, & Seggie, (2018), Allahar, & Sookram, (2019), Azzolino, Greco, Verteramo, Attanasio, Carravetta, & Granato, (2019), Bizri, Hammoud, Stouhi, & Hammoud, (2019), Centobelli, Cerchione, Esposito, & Shashi, (2019), Dolan, Cunningham, Menter, & McGregor, (2019), Fantauzzi, Frondizi, Colasanti, & Fiorani, (2019), Fischer, de Moraes, & Schaeffer, (2019), Freel, Persaud, & Chamberlin, (2019), Laalo, Kinnari, & Silvennoinen, (2019), Marques, Oliveira, Andrade, & Zambalde, (2019), Moreno, Muñoz, & Morote, (2019), Skute, (2019), Pickernell, Ishizaka, Huang, & Senyard, (2019), Rybnicek, Leitner, Baumgartner, & Plakolm, (2019), Sánchez‐Barrioluengo, Uyarra, & Kitagawa, (2019), Secundo, De Beer, Fai, & Schutte, (2019), David, Jones & Dean Patton (2020)

Exploration	Vickers et al. (2001), Lazzeroni and Piccaluga (2003)[a], Bramwell and Wolfe (2008)[a], Etzkowitz et al. (2008), Amiri et al. (2009), Carlsson et al. (2009), Nelles and Vorley (2011), Meyers and Pruthi (2011), Guerrero and Urbano (2012), , Deluyi et al. (2014)[a], Guerrero et al. (2014c), Callagher et al. (2015), Czarnitzki et al. (2015), Ferreira and Steenkamp (2015), Guerrero et al. (2015), Urbano and Guerrero (2013)[a,] Joseph (2015), Mok (2015), Salamzadeh et al. (2015), Ahmad et al. (2016)[a], Bikse et al. (2016) , Brown (2016), Carayannis et al. (2016), Culkin (2016), Etzkowitz (2016), Guerrero et al. (2016a), Iscaro, Castaldi, & Sepe, (2016), Guerrero, Urbano, & Herrera, (2017), Jager, Mthembu, Ngowi, & Chipunza, (2017), Jessop, (2017), Rhoades, & Stensaker, (2017), Klofsten, Fayolle, Guerrero, Mian, S. Urbano, & Wright, (2018), Riviezzo, Santos, Liñán, Napolitanoa, & Fuscoe, (2018), Shah, Shahjehanb, & Afsarb, (2018), Abdelkafi, Hilbig, & Laudien, (2018), Ardito, (2018), Budyldina, (2018), Soleimani et al. (2016), Carayannis, Grigoroudis, Campbell, Meissner, & Stamati, (2018), Clauss, Moussa, & Kesting, (2018), Dalmarco, Hulsink, & Blois, (2018), Giones, (2019), Dalmarco, Hulsink, & Blois, (2018), Guerrero, Urbano, Cunningham, & Gajon, (2018), Kaklauskas, Banaitis, Ferreira, Ferreira, Amaratunga, Lepkova, & Banaitienė, (2018), Matt, & Schaeffer, (2018), Meoli, Pierucci, & Vismara, (2018), Montiel-Campos, (2018), Mariani, Carlesi, & Scarfò, (2018), Patra, & Muchie, (2018), Qian, Xia, Liu, & Tsai, (2018), Sierra, & Villazul, (2018), Salomaa, (2019), Seguí-Mas, Oltra, Tormo-Carbó, & Sarrión-Viñes, (2018), Centobelli, Cerchione, Esposito, & Shashi, (2019), Cviji´c, Tatarski, Kati´c, Veki´c, & Borocki, (2019), Lombardi, Massaro, Dumay, & Nappo, (2019), Mascarenhas, Marques, Galvão, Carlucci, Falcão, & Ferreira, (2019), Pettersen, Kubberød, Vangsal, & Zeiner, (2019), Ricci, Colombelli, & Paolucci, (2019), Yoshioka-Kobayashi, (2019), Balasubramanian, Yang, & Tello, (2020)

5.3 Topic area wise and type of learning process wise

By combining the perspectives of subject area and form of learning process mentioned in (Table7), seven areas have been identified to be explored as following:

Area 1: "Taxonomy of definitions of academic entrepreneurship" (16 papers), focusing on key definitions.

Area 2: "Factors affecting exploitation in university" (48 papers), in which writers examine internal factors affecting entrepreneurship within university.

Area 3: "Factors affecting exploration in university" (28 papers), in which researchers examine external factors affecting entrepreneurship

Area 4: "Effects of exploitation" (13 papers), researchers study the results of exploitation activity

Area 5: "Effects of Exploration" (20 papers), researchers study the results of exploration activity

Area 6: "Measuring performance of undertaking university exploitation" (14 papers), in which writers examine the key approaches for measuring the performance of undertaking university exploitation

Area 7: "Measuring performance of undertaking university exploration" (6 paper) in which authors evaluate the key approaches for measuring the performance of undertaking university exploration

Table 7: Categorization of articles by topic area and type of learning process

Area	**Exploitation** **Exploration**	
Taxonomy of entrepreneurial university definitions	Etzkowitz (2003)a , Gibb and Hannon (2006), Mueller (2006), Siegel et al. (2007), Etzkowitz et al. (2008)a, Guerrero et al. (2008), Chang et al. (2009), Fayolle et al. (2010), Kirby et al. (2011), Guerrero and Urbano (2012)a, Budyldina, (2018), Markuerkiaga, Igartua, & Errasti, (2018), Posselt, Abdelkafi, Fischer, & Tangour,. (2018), Pugh, Lamine, Jack, & Hamilton, (2018), Marques, Oliveira, Andrade, & Zambalde, (2019), Moreno, Muñoz, & Morote, (2019), Ricci, Colombelli, & Paolucci, (2019)	
	Area 1	
Factors affecting entrepreneurial university	Gorman et al. (1997)a, Etzkowitz (2003)a, Kirby (2006), O'Shea et al. (2007), Atkinson and Pelfrey (2010), Bodunkova and Chernaya (2012), Urbano and Guerrero (2013)a, Pinheiro and Stensaker (2014), Sam and van der Sijde (2014), Blackmore and Sawers (2015), Carayannis et al. (2015), Dabic et al. (2015), Lam and de Campos (2015), Abesi et al. (2016), Chang	Etzkowitz et al. (2008)a, Amiri et al. (2009), Meyers and Pruthi (2011), Guerrero and Urbano (2012)a, Guerrero et al. (2014c), Mok (2015), Salamzadeh et al. (2015), Ahmad et al. (2016)a, Bikse et al. (2016), Urbano and Guerrero (2013)a, Carayannis et al. (2016), Culkin (2016), Iscaro, Castaldi, & Sepe, (2016), Leih and Teece (2016), Soleimani et

	et al. (2016), Guerrero et al. (2016b)a, Hark (2016), Hayter (2016), McClure (2016), Reyes (2016), Salamzadeh et al. (2016), Sideri and Panagopoulos (2016), Striedinger et al. (2016), Urbano, Aparicio, Guerrero, Noguera, & Torrent-Sellens, (2016), Brem, & Radziwon, (2017), Kalitanyi, & Bbenkele, (2017), Unger, & Polt, (2017), Wynn, & Jones, (2017), Ahmad, Halim, Ramayah, Popa, & Papa, (2018), Baglieri, Baldi, & Tucci, (2018), Bouncken, (2018), Davari, Emami, Ramadani, & Taherkhani, (2018), Fischer, Schaeffer, & Queiroz, (2018), Fleacă, Fleacă, & Maiduc, (2018), Fustera, Padilla-Meléndeza, Lockettb, & Rosa-del-Águila-Obraa, (2018), Lahikainen, Kolhinen, Ruskovaara, & Pihkala, (2018), Martin, Warren-Smith, & Lord, (2018), Montiel-Campos, (2018), Seguí-Mas, Oltra, Tormo-Carbó, & Sarrión-Viñes, (2018), Uslu, & Arslan, (2018), Bizri, Hammoud, Stouhi, & Hammoud, (2019), Dolan, Cunningham, Menter, & McGregor, (2019), Fantauzzi, Frondizi, Colasanti, & Fiorani, (2019), Fischer, de Moraes, & Schaeffer, (2019), Lombardi, Massaro, Dumay, & Nappo, (2019), Mascarenhas, Marques, Galvão, Carlucci, Falcão, & Ferreira, (2019), Pickernell, Ishizaka, Huang, & Senyard, (2019), Rybnicek, Leitner, Baumgartner, & Plakolm, (2019), Sánchez‐Barrioluengo, Uyarra, & Kitagawa, (2019), Yoshioka-Kobayashi, (2019)	al. (2016), Guerrero, Urbano, & Herrera, (2017), Jessop, (2017), Rhoades, & Stensaker, (2017), Abdelkafi, Hilbig, & Laudien, (2018), Ardito, (2018), Carayannis, Grigoroudis, Campbell, Meissner, & Stamati, (2018), Clauss, Moussa, & Kesting, (2018), Dalmarco, Hulsink, & Blois, (2018), Mariani, Carlesi, & Scarfò, (2018), Shah, Shahjehanb, & Afsarb, (2018), Sierra, & Villazul, (2018), Giones, (2019), Rippa, & Secundo, (2019), Freel, Persaud, & Chamberlin, (2019), Pettersen, Kubberød, Vangsal, & Zeiner, (2019), Salomaa, (2019), Skute, (2019), Jones & Patton (2020) **Area 3**

	Area 2	
Effects of entrepreneurial issues on university activity	Lazzeroni and Piccaluga (2003), Rubino and Freshman (2005)a, Bramwell and Wolfe (2008)a, Nelles and Vorley (2011), Louw and Moloi (2013), Guerrero et al. (2015), Joseph (2015), Kalar and Antoncic (2015), Bienkowska et al. (2016), Guerrero et al. (2016b)a, Kazin, Hagen, Prichislenko, & Zlenko, (2017), Kirs, Karo, & Lumi, (2017), Kochetkov, Larionova, & Vukovic, (2017), Trevitt, Steed, Moulin, & Foley, (2017), Liu, & Huang, (2018)	Vickers et al. (2001)a, Lazzeroni and Piccaluga (2003)a, Bramwell and Wolfe (2008)a, Carlsson et al. (2009), Callagher et al. (2015), Czarnitzki et al. (2015), Ferreira and Steenkamp (2015), Brown (2016), Guerrero et al. (2016a), Etzkowitz, (2016), Jager, Mthembu, Ngowi, & Chipunza, (2017), Guerrero, Urbano, Cunningham, & Gajon, (2018), Matt, & Schaeffer, (2018), Cviji , Tatarski, Kati, Veki, & Borocki, (2019)
	Area 4	**Area 5**
Entrepreneurial university performance measurement	Mahdavi Mazdeh et al. (2013), Wang (2013), Deluyi et al. (2014)a, Gianiodis et al. (2016), Gür, Oylumlu, & Kunday, (2016), Khvatova, & Dushina, (2016), Maritz, (2017), Errasti, Bezanilla, García-Olalla, Auzmendi, & Paños, (2018), Uslu, Calikoglu, Seggie, & Seggie, (2018), Sánchez-Barrioluengo, & Benneworth, (2018), Carravetta, & Granato, (2019), Centobelli, Cerchione, Esposito, & Shashi, (2019), Laalo, Kinnari, & Silvennoinen, (2019), Secundo, De Beer, Fai, & Schutte, (2019)	Deluyi et al. (2014)a, Amaratunga, Lepkova, & Banaitienė, (2018), Kaklauskas, Banaitis, Ferreira, Ferreira, (2018), Meoli, Pierucci, & Vismara, (2018), Patra, & Muchie, (2018), Qian, Xia, Liu, & Tsai, (2018), Riviezzo, Santos, Liñán, Napolitanoa, & Fuscoe, (2018), Iazzolino, Greco, Verteramo, Attanasio, Allahar, & Sookram, (2019), Balasubramanian, Yang, & Tello, (2020)
	Area 6	**Area 7**

5.3.1 Area 1: Classification of definitions of Academic Entrepreneurship

The field contains 16 articles and offers a taxonomy of the undertaking university's key concepts that preceded Clark's first one (1998b). The importance of this term was first indicated by Etzkowitz (2003), who supports the idea that by offering a support system to faculty and students to launch new projects the universities can become hub of incubators. Guerrero et al., (2008) note that "an entrepreneurial university not only facilitates several entrepreneurial support initiatives, but also establishes administrative procedures, strategies or competitive positions."

5.3.2 Area 2: Factors affecting exploitation in university

This area consists of 48 that focus on internal factors shaping the universities 'transition toward the business model. It regards the essential factors, Gorman et al., (1997) define the organizational factors influencing the development of undertaking universities as comprised of the factors such as attributes, assignments, active project participation, skills, functional integration and stage for venture growth. While there is an evolution of courses on entrepreneurship, Gorman, Hanlon, and King (1997) note an absence of systematic approach. The association between endogenous and exogenous features which affect the exploitation of undertaking universities (Etzkowitz, 2003). This paper defines entrepreneurial university growth as an unseen transition arising from the dynamic interrelationship of endogenous factors (bottom-up approach- driven by lower stratums values of the university) and exogenous factors (top-down approach- determined by management) (Shah, Shahjehanb & Afsarb, 2018). A global strategy is needed at the university to turn conventional education into an entrepreneurial education. This approach is tied to quality education practices and reward approaches. Awareness and human resources constitute the principal advantage in this economy. O'Shea, Allen, Morse, O'Gorman and Roche (2007) discuss the key factors influencing the performance of universities in entrepreneurship: human growth, organizational policies and processes, and organizational culture. Bodunkova and Chernaya (2012) display that the business university model should be fractal for establishing the university's co-entrepreneurial community. The innovation of universities is the product of a further globalized higher education which renews traditional actions, responsibilities, roles, and resource redistribution. Brem and Radziwon (2017) examine how political, technical, and social capital is the subject of the Denmark universities. All of these features expand activities that allow universities to improve their mission to be entrepreneurs.

Concerning the obstacles touching the cycle of production, Kirby (2006) identifies the factors negatively affecting the growth of the entrepreneurship university. Explicitly, there are numerous obstacles that obstruct the entrepreneurial cycle (such as the protection of the hierarchical structure of corporate culture, the deficiency of entrepreneurial capacity, the abstract nature of relationships, the need for instant results, the need for power, the inappropriate methods of remuneration, the time aspect). This article also analyzes how universities will understand the entire need as a part of their missions. In summary, the papers published in this second area focus on models, approaches and internal characteristics which drive or hinder the growth of the university of entrepreneurs. The content investigation in this field shows that the entrepreneurial university's organizational experiences are being studied, but not fully exploring the emphasis on challenges and the way to address them. In addition, these papers identify the business university's organizational models, but additional attempts to examine more deeply the university's exploitation learning process and how it influences the entrepreneurial profile's unique skills are required.

5.3.3 Area 3: Factors affecting exploration in university”
This field contains twenty-eight papers based on external factors influencing universities 'evolution toward the entrepreneurial model. Six papers deal directly with the relationship between the business university and the companies Etzkowitz et al. (2008); Amiri, Kavonsy and Hussemi (2009); Meyers and Pruthi (2011); Guerrero and Urbano (2012); Shah, Shahjehanb and Afsarb (2018), seven articles look the relationship with policy by Etzkowitz et al. (2008); Amiri, Kavonsy and Hussemi (2009); Meyers and Pruthi (2011); Urbano and Guerrero (2013); Shah, Shahjehanb and Afsarb (2018); five articles explain the relationship with the external organizational environment (Amiri, Kavonsy & Hussemi, 2009; Meyers & Pruthi, 2011; Guerrero and Urbano, 2012; Urbano and Guerrero, 2013; Guerrero, Urbano. Cunningham & Organ, 2014c).

The writers study how the best approach is interpreted by joining the field of inquiry. Etzkowitz et al. (2008) establish the triple helix model, defined by three factors: business, government, and the university of entrepreneurs. The current model is based on a cybernetic response mechanism which is self-reinforcing. The university needs to investigate reasons to develop latest ideas, and then turn them into monetary ventures, according to Guerrero and Urbano (2012). Nonetheless, this paper analyzes that a plan is required to help the company university's exploration cycle. The university's ideal internal organization is connected to businesses and engaged in practices that are far from conventional study and teaching. It's focused on an incentive framework for empowering networks of students. The partnership amid firms and universities actually enables a new way of having scientific research to be established. Guerrero, Urbano, Cunningham and Organ (2014c) examine the environmental factors that affect the educational programs for entrepreneurship. The Spanish and Irish universities pose similar facets of the climate. Regional players are promoting entrepreneurship into an atmosphere that allows for knowledge exchange and interaction. Urbano and Guerrero (2013) in addition say that the educational system strengthens internal factors at the Catalan university, while regional actors supported environmental factors leading to the growth of entrepreneurship exploration.

In sum, the significance of the relationship between university, firms, and government, emerges from the literature, but the concept of external approaches is scarcely examined to establish this explorative synergy.

5.3.4 Area 4: Effects of Exploitation activities:
The fourth field includes thirteen articles which focus on the impact of the process of exploitation on university actions. These articles deal directly with the impact on the internal organization of the exploitation learning process or the influence on the individual skills that define the entrepreneurial outline. As far as the internal organization is concerned, Centobelli, Cerchione, Esposito and Shashi (2018) discuss how the universities will address an emerging need that carries forward the university's conventional definition. They identify the need to address the following main challenges, such as leveraging intellectual property more widely and developing new learning manners. Kirs, Karo and

Lumi (2017) show that learning-centered activities are critical that enable learners to improve their entrepreneurial behavior in future. It emerges from this analysis that the university is not a source of merchantable information, but it offers frameworks for the transfer of knowledge. Authors define the Waterloo University case study as a significant source of derivative development and funding for talented individuals with radical, creative entrepreneurial practices. A central engine keeps the synergy between teaching and science. The manipulation of organizational aspects by the entrepreneurial university has an influence on the skills that define the entrepreneurial profile (Rubino & Freshman, 2005). In particular, the authors examine various ability bunches that are strengthened by leveraging academic courses (such as communicating ideas, making decisions, building trust, internal locus of control, risk-taking, motivating team members, tolerance of ambiguity, strategic thinking).

By summary, the articles contained in this field identify a more enterprising approach to university research. There is a constant process of science, teaching, and creativity. Shared information should adapt to the external compression of innovative procedures which are increasingly rapid. To develop entrepreneurial skills, this form of knowledge requires the development of learning-centric activities. It is obvious from the literature that the skills fitting to the entrepreneurial profile are influenced by the cycle of pursuing university exploitation, but there is hardly any study of how to develop them. This is a void that needs to be filled in in order to identify a wide-ranging collection of skills that describe the company profile.

5.3.5 Area 5: Effects of exploration activities

The fifth field contains twenty papers and analyzes the effect on academic operation of pursuing academic exploration. More in depth, these papers discuss the company relationship, the policy relationship, or the environmental relationship. Carlsson, Acs, Andretsch and Beaunerhjelm (2009) demonstrate how the use of information impacts economic actions. The capacity to apply knowledge relies on the official structures and the quality of the information that has been generated. Likewise, the university of entrepreneurs as an engine for economic actions as described (Nelles & Vorley, 2011). However, the most critical forces in the 2nd academic revolt were policy and the environment. The university itself is an embedded act, or in the area-wise economy, according to Bramwell and Wolfe (2008), and it has a transitional role for the local communal. Vickers, Salamo, Loewer and Ahlen (2001) define four factors that have led to the development of the entrepreneurial notion: the establishment of a technology contained business incubator, the centers of organized research actions, the subjects of entrepreneurship in degree programmes, and the partnership between universities and businesses. The contributions of many individual performers relating to businesses, universities and politics are desired to develop these systems. Finally, the University is identified here as a center for all regional, economic, and social growth (Lazzeroni & Piccaluga, 2003).

In summary, the papers in this field identify the fundamentals that have led to the development of entrepreneurial culture and the significance of entrepreneurial university exploration in establishing dyadic strategic relations with external actors (like other universities, companies, and policies), but do not thoroughly examine the complexities of those connections. The content review climaxes that given the policy and climate that contributed to the second academic revolution, it is now important to concurrently examine how individual actors influence the growth of the business university and how these performers are influenced by the development of entrepreneurial universities.

5.3.6 Area 6: Measuring performance of undertaking university exploitation
The sixth field contains fourteen papers and explains the key methods for assessing the efficiency of the undertaking exploitation of universities. Specifically, these papers focus on the output assessment measurements and appraisal techniques of the internal organization, which can be used to assess the process of conducting university exploitation. Allahar and Sookram, (2019) offer instructions on how to evaluate performance evaluation for business university manipulation, how to do future decisions and recognize vulnerable areas and divisions. Wang (2013) uses rough set theory approach to assess the success and efficiency of entrepreneurial university. Using Data Envelopment Analysis (DEA) Deluyi, Rashed, Sofian and Daud (2014) explores dysfunctional departments and institutions. Although these assessment methods assess the efficiency and output of an entrepreneurial university concentrating primarily on individual faculties and departments, a more detailed review of the various assessment approaches for performance improvement of the entrepreneurial university is nevertheless needed.

5.3.7 Area 7: Measuring performance of undertaking university exploration
The last field contains six articles reviewing the key methods for assessing the efficiency of the university exploration undertaking. These articles by Deluyi, Rashed, Sofian and Daud (2014); Riviezzo, Santos, Liñán, Napolitanoa and Fuscoe (2018); Qian, Xia, Liu and Tsai (2018); Patra and Muchie, (2018); Iazzolino, Greco, Verteramo, Attanasio, Carravetta, and Granato (2019); Balasubramanian, Yang and Tello (2020) describe a framework for recognizing unproductive universities and offers advice on how to boost optimizing performance on institutional policies. This paper's content analysis shows that the approaches used to assess the efficiency of the university exploration entrepreneurial cycle are rarely analyzed. Consequently, the literature does not include useful indicators for assessing the various types of business university success and does not recommend a collection of strategies for improvement of the exploration processes performance by leveraging on exact factors (such as policy issues, collaboration with firms, collaboration with other universities).

6. Conclusions and Recommendations

The present study used the mixture of methods proposed in earlier literature for systematic review of literature (Tranfield et al., 2003; Centobelli et al., 2017). In the initial phase research articles were retrieved from Web of science and Scopus from February 1990 to

March 2020. The findings of present study outline that literature is still unclear or there is no conclusion on the definition of AE hence, the future studies need to focus on the definition of AE. Moreover, the future studies need to define the AE considering the different dimensions of AE. Furthermore, the analysis revealed that there is a need to study the phenomenon of entrepreneurial university at the individual level.

Moreover, literature does consider the cultural context hence future studies need to focus on the cultural context prevail within university or country. Still to date literature most of the papers has been documented in the developed economies and hence the future studies need to consider the developing countries to fill the gap and evidence from developing countries. Moreover, literature the exploration and exploitation previously discussed at the organizational level while literature on the AE at the individual level fails to consider the role of research ambidexterity that includes exploitation and exploration hence the future studies need to consider the role of exploitation and exploration at the individual faculty members. As the study by Chang et al 2016 suggested that exploration and exploitation can be combined as research ambidexterity and studied at individual level. Moreover, the literature so far documented in the domain of AE does not consider the role of psychological empowerment and psychological climate particularly at the individuals as compared to organizations. Hence, the future studies need to consider the role of psychological empowerment and psychological climate in studies those focus on the individuals as compared to organizations. Moreover, various performance measures have been discussed in the earlier literature, while a limited literature has been documented on the entrepreneurial intentions among the individual faculty members. Future studies need to consider the individuals academic entrepreneurial intentions. The findings of present study will facilitate the academicians in understanding the role and significance of AE for the individual faculty members and for the universities. The findings of present study facilitate the managers or top management of universities in understanding the role of individual faculty members and organization in the AE. Furthermore, the findings of present study will facilitate the policymaker in understanding the role of AE in transformation and transfer of knowledge, employment generation and economic growth.

7. Limitations of the Study

As with every study this study too has certain limitations which can be addressed in future researches as well. First, the risk of bias assessment in the included studies was not scope of this paper and hence was not addressed. Secondly, no method was used to assess certainty in the body of evidence for an outcome of included studies.

8. Suggestions for Future Research

Based on the limitations of the study, it is important for future studies to expand the study area and also collect information about risk of bias assessment in the included studies. Again, future studies should assess certainty in the body of evidence of an outcome.

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