Perspective Research Entrepreneurship Output Performance in 1992-2009

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***Abstract*--This paper aims on research entrepreneurship output performance from 1992 to 2009. Data are based on the online version of ISI Web of Science from 1992 to 2009 focusing on SSCI publishing paper that topic is to respect on entrepreneurship. This study synthetically uses the bibliometric method, study entrepreneurship institute and country analysis, source title, author keyword, and keyword plus analysis, to map global research entrepreneurship during the period of 1992–2009. The data shows research entrepreneurship performance top fifty countries ranking is USA, UK, Canada, Germany, Netherlands, Spain, Sweden, Australia, France, Italy, Finland, Israel, Singapore, Denmark and Switzerland. The top ten publication institutes is Univ Nottingham, UK; Indiana Univ, USA; Max Planck Inst Econ, Germany; Univ Minnesota, USA; Babson Coll, USA; Harvard Univ, USA; Rensselaer Polytech Inst, USA; Univ Illinois, USA; Erasmus Univ, Netherlands and Case Western Reserve Univ, USA. The result finding four issues of innovation, entrepreneurship capital, corporate culture, and economic growth are the most popular issues in the research entrepreneurship field in the future. This investigation will help researchers realize the panorama of global research entrepreneurship trend, and establish further research direction.**

I. INTRODUCTION

Entrepreneurship the field is experiencing a concurrent growth in academe as evidenced by the increase of research centers, professional organizations, and journals specific to its study. Similar to the path that leadership scholars faced, those who study entrepreneurship also struggle with issues associated with a field in its early stages [1]. While entrepreneurial phenomena aimed at economic development have received a great amount of scholarly attention, entrepreneurship as a process to foster social progress has only recently attracted the interest of researchers [2].

Although most previous researchers of entrepreneurship have defined ''entrepreneurship'' exclusively in terms of who the entrepreneur is and what he or she does, and have tried to identify people who are relatively more likely to become entrepreneurs, this focus is problematic. By paying attention mostly to the individual, researchers assume that opportunities exist present and investigate the entrepreneurial process only after opportunities have been discovered [3], rather than how individuals discover opportunities. One of the most persistent and largely fruitless endeavors we have engaged in as entrepreneurship researchers consists in our efforts to understand differences between entrepreneurs and non-entrepreneurs both with respect to the decision to become entrepreneurs as well as the propensity to succeed in new venture creation. In this pursuit, we differ markedly from other areas of research [4]. Rapid changes in the world economy have made the pursuit of entrepreneurial opportunity increasingly important to wealth creation in most societies [5]. Entrepreneurship research is a relatively young field. Some argue that it is in its adolescence [6], others that it is still emerging [7]. Several studies in the management discipline have referenced and discussed entrepreneurship in terms of its development. Harrison and Leitch [8] found that entrepreneurship research published in management journals from 1987 to 1993 represented a very small percentage of all published entrepreneurship research. Aldrich and Baker [9] compared management and entrepreneurship research published from 1990 to 1995 and concluded that progress toward coherence in paradigm development in entrepreneurship research has been limited.

Several scholars have discussed the legitimacy issue of entrepreneurship research, referring to the extent to which research in entrepreneurship advances useful knowledge [7]. Harrison and Leitch [8] indicated that entrepreneurship research had to create a distinct position in the context of existing structures to achieve academic legitimacy. Entrepreneurship becomes a more distinct field of research when new theory is articulated, which is then recognized by scholars in other fields of research [9]. International entrepreneurship (IE) is a topic of interest to scholars from around the world. The contributions in this issue span national borders in three respects, notably significant international collaboration among several of the contributing authors, international or cross-national focus of the papers, and international importance of the theoretical, managerial and policy implications outlined by the researchers [10]. The IE literature is rich in geographic coverage at two levels: (1) the range of countries studied and (2) the researchers involved. At the researcher level, the IE literature seems to reflect the globalization of business research noted by Wright and Ricks [11], as studies are authored by scholars around the world. Although the fact that 31 studies involve US-based authors might suggest American dominance of the field only 18 of these are by "Americans only" [12].

The Science Citation Index (SCI) and Social Science Citation Index (SSCI) from the Institute for Scientific Information (ISI) Web of Science databases are the most important and frequently used database sources of choice for a broad review of scientific accomplishment in all fields of study [13]. This study uses the data from ISI Web of Science from 1992 to 2009 focusing on SSCI publishing paper that topic is to respect on entrepreneurship. The bibliometric method is a common research tool for this study analysis, this method widely applied for the scientific production and research trends in many science and engineering disciplines

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[14, 15, 16]. However, finding show little bibliometric study on the topic of current innovation or even in the whole field of innovation study [17]. The bibliometric method could be used to outline the advance of entrepreneurship in the past eighteen years. This study utilizes bibliometric method analysis research entrepreneurship issues and publication outputs performance of global. The results will offer the other scholars to do research entrepreneurship reference in the future.

In this paper, content and structure are as follows, respectively: Section 2 data sources and methodology; Section 3 describes research process, data analysis and discussion; Section 4 Conclusion.

II. DATA SOURCES AND METHODOLOGY

The data this study are based on the online version of the Social Science Citation Index (SSCI), Web of Science. The SSCI are and multidisciplinary data base of the Institute for Scientific Information (ISI), Philadelphia, USA. The journal Citation Reports (JCR), indexes 1,980 major journals with citation references across fifty-six scientific disciplines in 2009. The current study researched the online version of SSCI under the keyword "entrepreneurship" to compile a bibliography of all papers related on entrepreneurship research. This research reclassified articles origination for United State of America (USA), United Kingdom (UK), Canada, Germany, Netherlands, Spain, Sweden, Australia, and France and obtained the reported impact factor (IF) of each journal for the 2009 JCR.

The term "international collaboration" was designated to those articles coauthored by researchers from different countries. The term "single institute publication" was assigned if authors were from different institutes. All articles referring to entrepreneurship during the past eighteen years, including the last nine years of the 20th century and the first nine years of the 21st century were assessed by the following aspects: document type and language of publications, characteristics of publication outputs during 1992-2009, distribution of output in subject categories and journals, publication output of institutes, publication outputs of country and source title, author keyword, and keyword plus analysis.

III. RESULTS AND DISCUSSION

A. Document type and language of publication

This work analyzed the distribution of the document type identified by ISI and found eleven document types in the total 3,924 publications. Article (2,667) was the most frequently used document type comprising 68% of total production, followed distantly by book review (445; 12%), proceedings paper (327; 8.3%), review (268; 6.8%), and editorial materials (157; 4.0%). The others showing less significance included meeting abstracts(27), notes(9), letters(6), biographical items(4), corrections(3), reprints(1), discussions(5), addition corrections(4). Journal articles represented the majority of document types that were also peer-reviewed within this field. This study only used 2,667 original articles for further analysis as relevant citable items and discards all other. Ninety-six percent of all these journal articles were published in English. Several other less used languages included: Spanish(22), German(21), Russian(13), Czech (9), Swedish(9), French(9), Slovak(7), Croatian(6). Still other less published languages included: Turkish(2), Portuguese(2), Danish(2), and one of Ukrainian, Norwegian, and Japanese.

B. Characteristics of publication outputs during 1992-2009

Figure 1 displays the total publication amounts of SSCI articles including "entrepreneurship" in their titles during the last 60 years. Research entrepreneurship continually grew along with SSCI development during this long period, increasing significantly in the year 1994 and rocketing in the 21st century. Built on many breakthroughs in the study period during in 1992-2009, especially in the recent decade, research entrepreneurship has become one of the most important issues and dynamic fields of academic.

In the past eighteen years, the annual number of published articles devoted to research entrepreneurship increased from 40 in 1992 to 443 in 2009, with a stable increase in the number of journals article (**Table 1**). The average article length fluctuated slightly, with an overall average length of fifteen to eighteen pages. The average number of authors per article rose from 1.7 authors per article in 1992 to 2.2 in 2009. Papers in 1992 cited thirty-eight references, compared to fifty-six cited references per paper in 2009, averaging forty-nine cited references per paper.

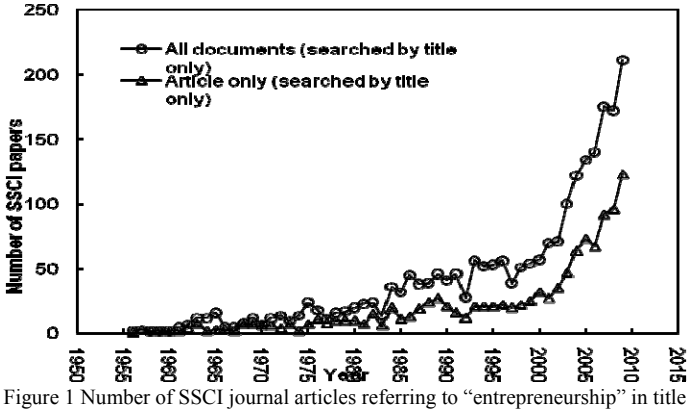

Figure 1 Number of SSCI journal articles referring to "entrepreneurship" in title

TABLE 1 CHARACTERISTICS BY YEARS OF PUBLICATION OUTPUTS FROM 1992 TO 2009

PY	TP	AU	AU/TP	PG	PG/TP	NR	NR/TP
1992	40	66	1.7	588	15	1510	38
1993	50	88	1.8	776	16	1687	34
1994	68	113	1.7	1055	16	2472	36
1995	61	99	1.6	986	16	2421	40
1996	57	97	1.7	956	17	2518	44
1997	69	127	1.8	1421	21	2937	43
1998	78	128	1.6	1408	18	3341	43
1999	67	96	1.4	1240	19	3052	46
2000	91	176	1.9	1837	20	3892	43
2001	93	176	1.9	1839	20	5000	54
2002	104	189	1.8	1854	18	4815	46
2003	157	293	1.9	2880	18	7383	47
2004	166	297	1.8	2984	18	8005	48
2005	220	455	2.1	3896	18	10979	50
2006	237	505	2.1	4389	19	11481	48
2007	310	654	2.1	6161	20	15649	50
2008	356	729	2.0	6257	18	17772	50
2009	443	977	2.2	8137	18	24758	56
Average			2.0		18		49

TP: Number of publications; PG: Page count; NR: Cited reference count; AU: Number of authors; PG/P, NR/P, and AU/P: average of pages, references, and authors in a paper

Figure 2 shows the progression in the number of articles published each year from 1992 through 2009. The data shows stable increase growth from 1992 to 2009 on research entrepreneurship articles all over the world. In recently, scholar points out entrepreneurship and innovation have signification correlation [18]. Consequently, research entrepreneurship topic is become on of most hot issues.

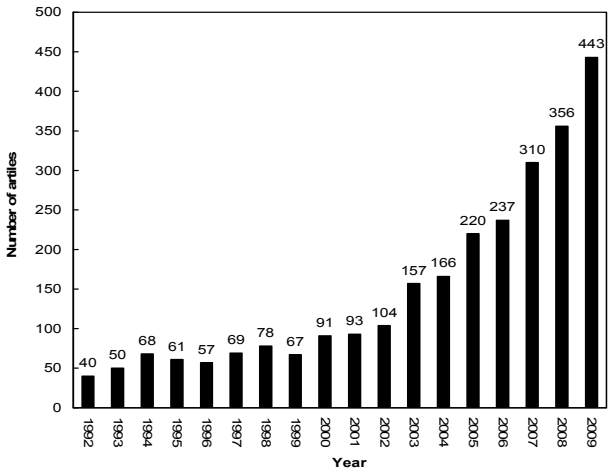

Figure 2 The number of each year publications during 1992-2009

C. *Distribution of publication output of subject categories and journals*

Base on the classification of subject categories in JCR, the publication output date of research entrepreneurship is distributed in ninety-three subject categories including 42 SSCI and 51 SCI subject categories, and other two are not SSCI or SCI subject categories in 2009. To further study global trends on research entrepreneurship, this work compares between "business", "management", "economics", "planning and development", "sociology", "geography", "environment studies" during the period of 1992-2009.

All author keywords of articles referring to "business", "management", "economics", "planning and development", "sociology", "geography", "environment studies" are statistically analyzed in **Figure 3**. "Business" research focuses on the corporate culture, customer orientation, innovativeness, and market performance [19]. Business performance (relative profitability, relative size, relative growth rate, and relative share of market) positively correlates with customer's evaluation of the supplier's customer orientation, but the supplier's own assessment of customer orientation does not correspond well to that of the customer [20]. Business issue topics experienced stable growth from 1992 to 2004 and highest growth rate in last five years. "Economics" is also a popular keyword (*e.g.*, market economics, individual economics, macroeconomics and industrial economics). Clustering and the new economics of competitive economic geography in an era of global competition pose a paradox. Open global markets, rapid transportation, and high-speed communications should allow any company to source anything from any place at any time [21]. Creating competitive economics geography has become one of the most important factors. The analysis data show that economics issues have a smooth incremental curve from 1992 to 2001. But the economics topic became a hot issue in 2002 when American economics declined after the 911 event in 2001, drawing down economies worldwide. Many scholars discuss entrepreneurship in light of world economics. From 2008 to 2009 global economics faced a recession that has become a popular topic for economic discussions.

Research entrepreneurship related to "management" and "business" application to enterprise entrepreneurship will undoubtedly maintain entrepreneurship research hotspots in the future. **Table 2** analyzes subject categories containing over 3924 entrepreneurship related articles and the top thirty most published journals on entrepreneurship. The analysis date displays that 29.2% of the articles reside in ten core journals. These top ten core journals rank as follows: Journal of Business Venturing (201; 7.5%), Small Business

Economics (154; 5.8%), Entrepreneurship Theory and Practice (93; 3.5%), Entrepreneurship and Regional Development (67; 2.5%), Journal of Small Business Management (49; 1.8%), Research Policy (48; 1.8%), Technovation (47; 1.8%), International Small Business Journal (44; 1.6%), Strategic Management Journal (43; 1.6%), International Journal of Technology Management (35; 1.3%).

As the use of statistics in any scientific discipline can be considered a key element in evaluating its degree of maturity [22], the result provides a current view of entrepreneurship research emphases of this topic. A total of 2,667 articles were published in a wide range of 656 journals including specialty journals, but also in journals of other disciplines belonging to 93 subject categories above.

TABLE 2 TOP THIRTY MOST PUBLISHED JOURNALS ON ENTREPRENEURSHIP

Source Title	TP	%	IF	Subject Category
Journal of Business Venturing	201	7.5	2.26	Business
Small Business Economics	154	5.8	1.38	Business; Economics; Management
Entrepreneurship Theory and Practice	93	3.5	1.704	Business
Entrepreneurship and Regional Development	67	2.5	1.02	Business; Planning & Development
Journal of Small Business Management	49	1.8	1.088	Management
Research Policy	48	1.8	2.261	Management; Planning & Development
Technovation	47	1.8	2.466	Engineering, Industrial; Management; Operations Research & Management Science
International Small Business Journal	44	1.6	1.347	Business; Management
Strategic Management Journal	43	1.6	4.464	Business; Management
International Journal of Technology Management	35	1.3	0.419	Engineering, Multidisciplinary; Management; Operations Research & Management Science
Organization Studies	32	1.2	2.124	Management
Journal of Business Ethics	31	1.2	1.088	Business; Ethics
Regional Studies	28	1.0	1.462	Environmental Studies; Geography
Journal of World Business	28	1.0	2.627	Business
Journal of International Business Studies	25	0.94	3.766	Business; Management
Journal of Business Research	23	0.86	1.293	Business
Management Science	22	0.82	2.227	Management; Operations Research & Management Science
Journal of Management Studies	22	0.82	2.805	Business; Management
Organization Science	19	0.71	3.126	Management
International Business Review	19	0.71	1.062	Business
Journal of Management	19	0.71	4.429	Business; Management
Family Business Review	18	0.67	1.881	Business
European Planning Studies	16	0.60	0.678	Environmental Studies; Geography; Planning & Development; Urban Studies
World Development	15	0.56	1.225	Economics; Planning & Development
R & D Management	15	0.56	0.928	Business; Management
Economic Development Quarterly	15	0.56	0.633	Economics; Planning & Development; Urban Studies
Journal of Organizational Change Management	15	0.56	0.6	Management
Academy of Management Journal	13	0.49	6.483	Business; Management
Journal of Technology Transfer	13	0.49	0.875	Engineering, Industrial; Management
Journal of Evolutionary Economics	13	0.49	0.947	Economics

IF : impact factor; TP: total published articles; %: percentage of all articles published in the years

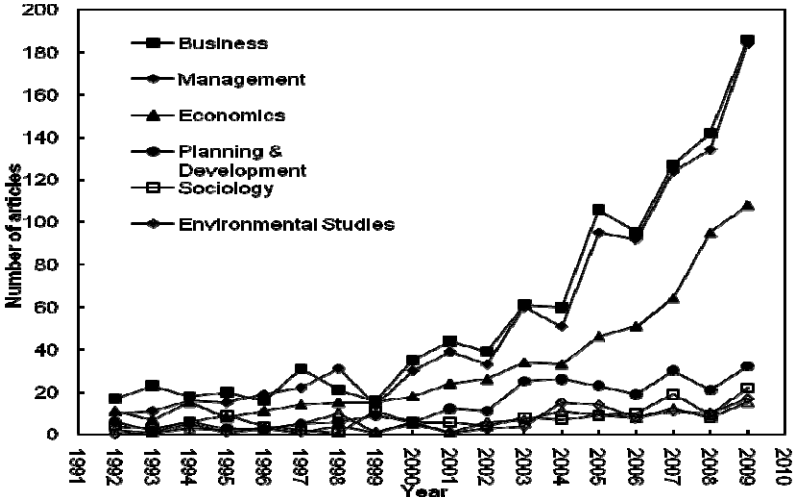

Figure 3 Comparison the growth trends of subject categories

D. Distribution of country publications

This study estimated the contribution of different countries by the location of at least one published author. The investigation ranked the top thirty countries by number of publications, including the number and percentage of single country articles and internationally collaborated articles (**Table 3**). Two North American countries, two South American countries, seventeen European countries, seven Asian countries, South African and Australia ranked in the top thirty publications. South African country ranked with the top twenty-one productive country. The four major industrial countries (G4: Canada, Germany, UK, and the USA) ranked in the top four for world publications and the Japan was ranked at twenty two. The G4 demonstrated high productivity in independent papers, totaling 1,991 (76.8%) of all independent papers. The earliest entrepreneurship research occurred in these industrial countries, which conducted the earliest and the most relative research performances. The USA showed the greatest counts of world publications, followed distantly by other countries. The USA also had the most–frequent partners, accounting for 58 percent of all international collaborative articles during the last sixteen years. But compared to its total publications, the USA presented a very low percentage (24%) of collaboration with outside authors.

The global trend of research entrepreneurship accords with developmental trends toward world multi-polarization and scientific research globalization, while other countries in the world gradually increased their disparities with the USA Figure 4 displays the time-trend analysis among eight others major countries. The figure shows an obvious rise in the number of articles related to research entrepreneurship in all eight countries, while the rapid development of global innovation research in the last eighteen years was partly driven by these countries' contributions.

The Netherlands has the highest growth rate in the past ten years, with the highly share (55%) of international collaborative articles in its total publications among the top thirty productive countries, representing its powerful independence in entrepreneurship related research field. A series of positive policies undoubtedly motivate the rapid development of the entrepreneurship research in the Netherlands. Another significant point is that Canada (7.4%) and Germany (6.4%), have kept ahead of other countries in the last decade. The percentage of publications from Spain, Sweden and France in the period of 1992–2009 has slightly increased, indicating that the growth rate of entrepreneurship research in these three countries is a little slower than in other productive countries. The increase could be attributed to various factors, while entrepreneurship research itself refers to science, technology, competitiveness and national politics.

TABLE 3 TOP THIRTY MOST PRODUCTIVE COUNTRIES OF ARTICLES DURING 1992-2009

Country	TP	TP R (%)	SP R (%)	CP R (%)	FA R (%)	RP R (%)	CP R%
USA	1208	1 (47)	1 (44)	1 (58)	1 (42)	1 (41)	290 (24)
UK	427	2 (16)	2 (14)	2 (28)	2 (13)	2 (13)	142 (33)
Canada	191	3 (7.4)	3 (4.7)	3 (18)	3 (5.6)	3 (5.8)	92 (48)
Germany	165	4 (6.4)	4 (4.4)	4 (15)	4 (4.6)	4 (4.6)	73 (44)
Netherlands	117	5 (4.5)	7 (2.5)	5 (13)	6 (3)	6 (3)	64 (55)
Spain	90	6 (3.5)	5 (3.2)	9 (4.8)	5 (3.1)	5 (3.1)	24 (27)
Sweden	90	6 (3.5)	6 (2.9)	7 (6)	7 (2.9)	7 (2.9)	30 (33)
Australia	72	8 (2.8)	8 (1.8)	6 (6.8)	8 (2)	8 (2)	34 (47)
France	50	9 (1.9)	13 (1.1)	8 (5.6)	13 (1.2)	12 (1.3)	28 (56)
Italy	48	10 (1.9)	9 (1.4)	14 (3.6)	9 (1.4)	9 (1.4)	18 (38)
Finland	47	11 (1.8)	10 (1.3)	11 (4)	10 (1.4)	9 (1.4)	20 (43)
Israel	42	12 (1.6)	12 (1.2)	18 (3.2)	11 (1.4)	11 (1.3)	16 (38)
Singapore	40	13 (1.5)	13 (1.1)	14 (3.6)	12 (1.3)	13 (1.3)	18 (45)
Denmark	36	14 (1.4)	15 (0.91)	16 (3.4)	14 (1.2)	15 (1.1)	17 (47)
Switzerland	34	15 (1.3)	27 (0.53)	10 (4.6)	19 (0.81)	18 (0.83)	23 (68)
Belgium	34	15 (1.3)	23 (0.67)	11 (4)	17 (0.89)	16 (0.94)	20 (59)
Hong Kong	33	17 (1.3)	18 (0.77)	16 (3.4)	18 (0.85)	18 (0.83)	17 (52)
Taiwan	31	18 (1.2)	10 (1.3)	30 (0.8)	15 (1.1)	14 (1.1)	4 (13)
Norway	28	19 (1.1)	16 (0.86)	19 (2)	16 (0.93)	17 (0.91)	10 (36)
China	27	20 (1)	33 (0.38)	13 (3.8)	24 (0.58)	24 (0.59)	19 (70)
South Africa	25	21 (1)	16 (0.86)	26 (1.4)	20 (0.77)	20 (0.79)	7 (28)
Japan	25	21 (1)	18 (0.77)	24 (1.8)	23 (0.66)	21 (0.71)	9 (36)
New Zealand	25	21 (1)	20 (0.72)	19 (2)	21 (0.7)	21 (0.71)	10 (40)
Russia	24	24 (0.93)	23 (0.67)	19 (2)	21 (0.7)	23 (0.63)	10 (42)
Greece	21	25 (0.81)	25 (0.57)	24 (1.8)	28 (0.54)	26 (0.55)	9 (43)
Turkey	19	26 (0.73)	20 (0.72)	30 (0.8)	24 (0.58)	26 (0.55)	4 (21)
Ireland	19	26 (0.73)	32 (0.43)	19 (2)	29 (0.46)	29 (0.47)	10 (53)
South Korea	17	28 (0.66)	30 (0.48)	26 (1.4)	24 (0.58)	28 (0.51)	7 (41)
Poland	16	29 (0.62)	30 (0.48)	29 (1.2)	32 (0.42)	31 (0.43)	6 (38)
Austria	16	29 (0.62)	35 (0.29)	19 (2)	34 (0.39)	33 (0.39)	10 (63)

TP (%): the number of total publications; TPR (%): the share in total publications; SPR (%): the rank and percentage of single country publications; FAR (%): first author publications, RPR (%): corresponding author publications in total publications; CPR (%): internationally collaborative publications.

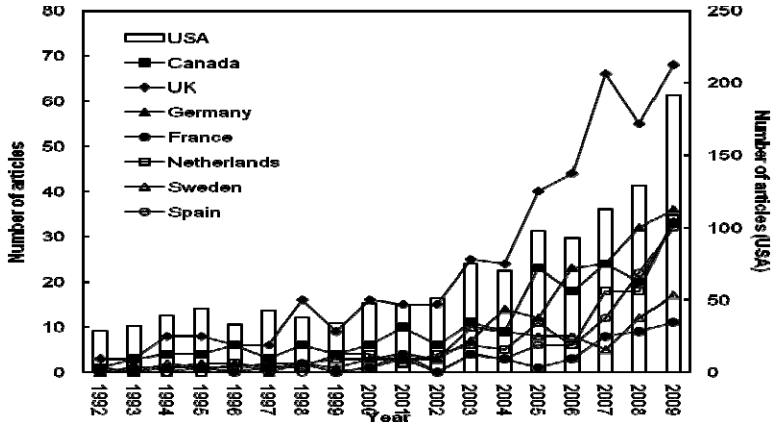

Figure 4 Growth comparison trends of the U.S.A, Canada, UK, Germany, France, Netherlands, Sweden Spain

E. Distribution of source title analysis

This study statistically analyzed all single words in titles of entrepreneurship related articles. In the analysis in **Table 4**, study analyzed thirty of the most frequently used single words in titles, which are all substantives, during the past eighteen year and in six-year periods respectively. Along with the growing number of articles, almost all the single words increased in the study period. "Entrepreneurship," "entrepreneurial" and "business" was emphasis words in entrepreneurship research articles during the eighteen-year study period, indicating the entrepreneurship application in development, business, firms, social and innovation processing. Innovation and new concepts in business operation have always been the mainstream issue in research. The words "capital" and "entrepreneurial" more frequently appeared in titles, while the percentage of articles with these two words increased from 0.87% to 4.8% and from 8.1% to 12% in 1992-2009. Some words such as "economic", "research", "evidence" and "venture" have an apparently higher growth rate than any other words, and have been most frequently used in recent periods. Taking "economic" as an example, the number and percentage of articles related to entrepreneurship research with "economic" in the title went up from the ranked number of 25 or 2.3% in 1992-1997 to the ranked number of 10 or 4.7% in 2004-2009. The percentage of some words such as "role", "corporate", "theory", "management" and "self-employment" obviously reduced due to some possible explanations. In the journal Entrepreneurship: Origins and returns by Berglann, Moen, Røed, and Skogstrømc it says our notion of entrepreneurship includes self-employment in the form of sole proprietorship as well as regular employment in partly self-owned limited liability companies and partnerships [23].

TABLE 4 TOP THIRTY MOST FREQUENT SUBSTANTIVES IN SOURCE TITLES DURING 1992-2009

Words in title	TP	92-09 R (%)	92-97 R (%)	98-03 R (%)	04-09 R (%)
entrepreneurship	811	1 (30)	1 (34)	1 (32)	1 (29)
entrepreneurial	299	2 (11)	2 (8.1)	2 (9.5)	2 (12)
business	227	3 (8.5)	3 (7.5)	3 (7.6)	3 (9)
firms	165	4 (6.2)	8 (4.3)	6 (5.4)	4 (6.8)
development	164	5 (6.1)	8 (4.3)	4 (6.3)	5 (6.5)
entrepreneurs	153	6 (5.7)	4 (6.1)	5 (5.9)	7 (5.6)
social	134	7 (5)	12 (3.5)	11 (4.1)	6 (5.7)
case	132	8 (4.9)	6 (4.6)	7 (4.7)	8 (5.1)
innovation	117	9 (4.4)	10 (3.8)	8 (4.4)	12 (4.5)
growth	113	10 (4.2)	13 (3.2)	10 (4.2)	13 (4.4)
firm	112	11 (4.2)	13 (3.2)	8 (4.4)	14 (4.3)
capital	106	12 (4)	97 (0.87)	13 (3.4)	9 (4.8)
role	105	13 (3.9)	25 (2.3)	20 (2.9)	11 (4.6)
economic	102	14 (3.8)	25 (2.3)	30 (2.2)	10 (4.7)
research	86	15 (3.2)	15 (2.9)	17 (3.1)	16 (3.3)
evidence	83	16 (3.1)	48 (1.4)	25 (2.5)	15 (3.6)
venture	82	17 (3.1)	15 (2.9)	14 (3.2)	17 (3.1)
corporate	80	18 (3)	5 (4.9)	26 (2.4)	23 (2.8)
analysis	78	19 (2.9)	19 (2.6)	20 (2.9)	18 (3)
management	76	20 (2.8)	10 (3.8)	30 (2.2)	20 (2.9)
theory	75	21 (2.8)	6 (4.6)	36 (2)	27 (2.7)
policy	72	22 (2.7)	48 (1.4)	20 (2.9)	20 (2.9)
technology	69	23 (2.6)	25 (2.3)	17 (3.1)	30 (2.5)
industry	68	24 (2.5)	19 (2.6)	14 (3.2)	33 (2.3)
market	68	24 (2.5)	97 (0.87)	20 (2.9)	26 (2.8)
self-employment	67	26 (2.5)	25 (2.3)	20 (2.9)	32 (2.4)
ventures	66	27 (2.5)	19 (2.6)	26 (2.4)	30 (2.5)
perspective	65	28 (2.4)	40 (1.7)	54 (1.5)	20 (2.9)
knowledge	63	29 (2.4)	#N/A	41 (1.9)	18 (3)

TP: the number of total publications; R (%): the rank and percentage of words in titles in total publications

F. Distribution of author keyword analysis

The source titles and author keywords supply "reasonable" details of the articles' subject. Author keyword analysis offers research trend information for researchers. The bibliometric method concern author keyword analysis only manifests in recent years [24], whereas author keywords analyzing the research trend is much more frequent [25]. Statistical analysis of keywords discovers directions of science, and is important for monitoring science development and programs. An examination of author keywords in this study period revealed that 3,810 author keywords were used. Among them, 3,050 keywords appeared only once, and 363 keywords appeared twice. The large number of once–only author keywords probably indicates a lack of continuity in research and a wide disparity in research focuses [26]. Author keywords appearing in the articles referring to entrepreneurship from 1992 to 2009 were calculated and ranked by six years of period. And total three periods.

Except for "entrepreneurship" which was a searching keyword in this study, only the single "entrepreneurship" keyword ranked in the top number one, with 604 articles or 40% of total articles (see **Table 5**). Other multiple keywords such as "economic development," "international entrepreneurship," and "corporate entrepreneurship" ranked number 6, with 35 articles (2.3% of total articles); ranked number 9, with 30 articles (2%); ranked number 17, with 23 articles (1.5%). These three words are also the basis of all worldwide entrepreneurship research. This study ranked "R&D" number 46, with 11 articles (0.72%), "technology" ranked 89, with 7 articles (0.46%).

During the past eighteen years, especially the last decade, "innovation", "self-employment" and "social capital" had extremely high increasing ranking rates of all the author keywords in the study period. Summary above data analysis display innovation, self-employment and social capital three author keywords indication the trend of research topics (see **Table 5**).

In the intersection of leadership and entrepreneurship: mutual respect to be learnt written by Cogliser and Brigham was published in 2004 [1], "entrepreneurship" is a relatively young field compared with its counterparts in management. It is in a very early stage of development from a conceptual and methodological perspective [9] and is currently viewed as being in a significant growth or emergent stage [7, 28]. The entrepreneurial phenomenon occurs at higher rates now than at any other time [28, 29], with 4% of all adults attempting a start-up venture at any given time.

TABLE 5 TOP THIRTY FREQUENTLY USED AUTHOR KEYWORDS DURING 1992-2009

Author Keywords	TP	92-09 R (%)	92-97 R (%)	98-03 R (%)	04-09 R (%)
entrepreneurship	604	1 (40)	1 (46)	1 (47)	1 (38)
innovation	121	2 (8)	2 (7.2)	2 (6.7)	2 (8.3)
self-employment	63	3 (4.1)	24 (1.4)	3 (4.3)	3 (4.3)
venture capital	36	4 (2.4)	#N/A	8 (2.8)	5 (2.4)
social capital	36	4 (2.4)	24 (1.4)	5 (3.1)	8 (2.3)
economic development	35	6 (2.3)	5 (4.3)	16 (1.6)	6 (2.3)
gender	34	7 (2.2)	#N/A	45 (0.79)	4 (2.7)
entrepreneurs	33	8 (2.2)	8 (2.9)	11 (2.4)	9 (2.1)
international entrepreneurship	30	9 (2)	#N/A	45 (0.79)	6 (2.3)
performance	29	10 (1.9)	24 (1.4)	13 (2)	10 (1.9)
china	27	11 (1.8)	24 (1.4)	23 (1.2)	10 (1.9)
networks	27	11 (1.8)	24 (1.4)	11 (2.4)	13 (1.7)
smes	26	13 (1.7)	24 (1.4)	8 (2.8)	16 (1.5)
entrepreneurialism	26	13 (1.7)	24 (1.4)	45 (0.79)	10 (1.9)
growth	24	15 (1.6)	#N/A	13 (2)	15 (1.6)
technology transfer	24	15 (1.6)	8 (2.9)	8 (2.8)	24 (1.3)
corporate entrepreneurship	23	17 (1.5)	5 (4.3)	5 (3.1)	28 (1)
small business	22	18 (1.4)	5 (4.3)	4 (3.5)	37 (0.83)
human capital	22	18 (1.4)	#N/A	16 (1.6)	16 (1.5)
knowledge	21	20 (1.4)	#N/A	107 (0.39)	13 (1.7)
entrepreneur	20	21 (1.3)	24 (1.4)	23 (1.2)	20 (1.3)
economic growth	19	22 (1.2)	#N/A	107 (0.39)	16 (1.5)
entrepreneurial orientation	18	23 (1.2)	#N/A	45 (0.79)	20 (1.3)
internationalization	18	23 (1.2)	#N/A	45 (0.79)	20 (1.3)
institutional theory	18	23 (1.2)	24 (1.4)	#N/A	19 (1.4)
social entrepreneurship	17	26 (1.1)	#N/A	107 (0.39)	20 (1.3)
occupational choice	17	26 (1.1)	#N/A	45 (0.79)	24 (1.3)
academic entrepreneurship	16	28 (1.1)	#N/A	23 (1.2)	27 (1.1)
strategy	16	28 (1.1)	24 (1.4)	16 (1.6)	32 (0.92)

TP: the number of total publications; R(%): the rank and percentage of words in titles in total publications

"Entrepreneurship" is a person who takes an active part in managing a company in which he/she also invests capital and thus bears a significant part of the economic risks involved. More precisely, we define an entrepreneur as a person who is either employed in a firm in which he or she is directly or indirectly a major/active owner (defined as either controlling at least 30% of the company or controlling at least 10% of the company and being a board member or a chief executive) or who runs his or her own business as self-employed element that maintains long term survival advantages for firms by utilizing R&D spillovers and geography of innovation and production [23]. On the contrary, this study noticed a visible decline in ranking of the keyword "technology transfer," "corporate entrepreneurship," "small business," and "new ventures". The decreased entrepreneurship factor might attribute to the reason mentioned above, that more specific or definite words replaced this general word. In the entrepreneurship research field, the decline in the ranking and percentage of author keywords above is attributed to the related lower growth rate with other relate words. We may conjecture that these gradually declining trends will continue in the future entrepreneurship research field.

G. Distribution of keywords plus analysis

Keywords plus provides search terms extracted from the titles of papers cited in each new article in the database in ISI [30]. In source title analysis, as we segment the title into single words, the result is not repeated and can be statistically analyzed by rule and line. However, this process breaks the integrality of phrases in the title. In author keyword analysis, we preserve intact words that authors want to transmit. Although it makes same single word or phrase appear in different author keywords, we can compare discrimination between author keywords, or sum up the dissimilar keywords with common phrase or single word for further study. Keyword plus analysis, as an independent supplement, reveals the articles' contents with more details. There are similar and dissimilar trends between their statistical results in this study periods. **Table 6** revealed the distribution of keywords plus with its rank and percentage in different periods. Just as the author keywords rank, some words (e.g., "entrepreneurship," "performance," "innovation," "growth," "firms," "management," "model," "industry," "knowledge," and "strategy") were also emphases of keywords plus in the study period. Except for "entrepreneurship," "performance," "innovation," "firms" and "growth", however, almost all other words show a low growth rate or even a decline in recent years. Similarly, the keywords plus show rank and percentage of "knowledge", "networks" as its flag keywords highly change from "74th, 1%," and "38th, 1.5%" in 1992–1997 to "7th, 8.7%," "14th, 5.8%" in 2004–2009 (see **Table 6**). This result indicates that knowledge and networks attracted extensive attentions during the last six years [31, 32].

The decline of these words might be due to the gradual maturity of these orientations in entrepreneurship research. Keywords plus analysis, as an additional search term, are usually more concerned about the novel research direction than the mature direction in the field [30]. The rank of many other keywords plus does not fluctuate clearly in study periods.

TABLE 6 TOP THIRTY FREQUENTLY USED KEYWORDS PLUS DURING 1992-2009

Keywords plus	TP	92-09 R (%)	92-97 R (%)	98-03 R (%)	04-09 R (%)
entrepreneurship	526	1 (25)	1 (21)	1 (21)	1 (27)
performance	383	2 (18)	6 (8)	2 (16)	2 (21)
innovation	246	3 (12)	4 (9.5)	3 (12)	3 (12)
growth	223	4 (11)	8 (6)	4 (10)	4 (12)
firms	220	5 (11)	5 (8.5)	5 (10)	5 (11)
management	180	6 (8.7)	2 (13)	7 (6.4)	6 (8.8)
model	160	7 (7.7)	3 (10)	9 (6)	8 (7.9)
industry	159	8 (7.7)	15 (3.5)	6 (8.7)	8 (7.9)
knowledge	143	9 (6.9)	74 (1)	19 (3.7)	7 (8.7)
strategy	125	10 (6)	7 (7)	7 (6.4)	14 (5.8)
organizations	123	11 (5.9)	20 (2.5)	12 (5.3)	10 (6.6)
business	122	12 (5.9)	15 (3.5)	13 (4.8)	11 (6.5)
self-employment	112	13 (5.4)	38 (1.5)	14 (4.6)	12 (6.2)
firm	110	14 (5.3)	11 (4)	10 (5.5)	16 (5.4)
perspective	101	15 (4.9)	38 (1.5)	29 (3)	13 (5.9)
networks	100	16 (4.8)	38 (1.5)	22 (3.2)	14 (5.8)
corporate entrepreneurship	95	17 (4.6)	10 (4.5)	20 (3.4)	17 (4.9)
competitive advantage	86	18 (4.1)	145 (0.5)	20 (3.4)	18 (4.9)
united-states	84	19 (4)	18 (3)	16 (3.9)	20 (4.2)
technology	83	20 (4)	11 (4)	15 (4.1)	24 (4)
determinants	83	20 (4)	38 (1.5)	16 (3.9)	19 (4.4)
behavior	81	22 (3.9)	11 (4)	22 (3.2)	21 (4.1)
ventures	75	23 (3.6)	15 (3.5)	45 (2.1)	21 (4.1)
entry	74	24 (3.6)	20 (2.5)	34 (2.5)	23 (4)
strategies	72	25 (3.5)	20 (2.5)	34 (2.5)	25 (3.9)
success	72	25 (3.5)	9 (5)	29 (3)	26 (3.4)
market	68	27 (3.3)	20 (2.5)	16 (3.9)	28 (3.2)
liquidity constraints	62	28 (3)	145 (0.5)	29 (3)	27 (3.3)
organization	61	29 (2.9)	38 (1.5)	10 (5.5)	39 (2.4)

TP: the number of total publications; R (%): the rank and percentage of words in titles in total publications

H. Production institutes of articles

This study analyzes the publication contribution of production institutes regarding entrepreneurship articles. The analysis data displays the top thirty most productive institutes of articles during 1992–2009 (see **Table 7**). We found the top ten productive institutes and USA institute ranked as having the most publication are as follows: Indiana University, University of Minnesota, Babson College, Harvard University, Rensellaer Polytech Institute, University of Illinois, and Case Western Reserve University. University of Nottingham, UK, has previously had the most publication articles on entrepreneurship research. University of Nottingham in its percentage of first author publications, corresponding author publications, and in total publications of the three criterion domains obtains number one ranking. Number 11 to 15 ranking data show those six institutes also North American region university institutes that mean point out research energy respect on North American country. Following the top thirty productive institutes, analysis data shows UK institutes (University of Nottingham) rank number one, USA institutes (Indiana University) rank second, and Germany institutes (Max Planck Institutes Economic) rank third. Analysis data results point out the top ten universities worldwide that focus on entrepreneurship issues to do research.

IV. CONCLUSION

This study on entrepreneurship papers dealing with SSCI, obtained some significant points on research performance throughout the period from 1992 to 2009. There were a total of 656 journals listed in the 93 subject category. Subject categories for mainstream research on entrepreneurship included seven domains of business, management, economics, planning and development, sociology, environment studies and geography, while increasing attention was invested of the research entrepreneurship field in the 21st century. The USA notably contributed the most independent and international collaborative articles, and had the most first author and corresponding author publications in total publication articles. By synthetically analyzing the distribution and change of source title, author keywords and keyword plus, this paper describe research development on entrepreneurship during the last decade, and predict the future orientation of

TABLE 7 TOP THIRTY MOST PRODUCTIVE INSTITUES OF ARTICLES DURING 1992-2009

Institute	TP	TP R (%)	SP R (%)	CP R (%)	FA R (%)	RP R (%)	CP R (%)
Univ Nottingham, UK	41	1 (1.6)	2 (1)	4 (2.3)	1 (1.2)	1 (1.1)	27 (66)
Indiana Univ, USA	40	2 (1.5)	83 (0.21)	1 (3.1)	9 (0.66)	12 (0.59)	37 (93)
Max Planck Inst Econ, Germany	37	3 (1.4)	57 (0.28)	2 (2.8)	21 (0.5)	21 (0.51)	33 (89)
Univ Minnesota, USA	34	4 (1.3)	26 (0.42)	3 (2.4)	13 (0.58)	14 (0.55)	28 (82)
Babson Coll, USA	34	4 (1.3)	7 (0.71)	6 (2)	5 (0.81)	3 (0.83)	24 (71)
Harvard Univ, USA	32	6 (1.2)	1 (1.1)	12 (1.4)	2 (1)	2 (1)	17 (53)
Rensselaer Polytech Inst, USA	31	7 (1.2)	3 (0.92)	11 (1.5)	3 (0.85)	3 (0.83)	18 (58)
Univ Illinois, USA	30	8 (1.2)	16 (0.5)	7 (2)	5 (0.81)	6 (0.79)	23 (77)
Erasmus Univ, Netherlands	30	8 (1.2)	83 (0.21)	4 (2.3)	51 (0.31)	49 (0.31)	27 (90)
Case Western Reserve Univ, USA	29	10 (1.1)	26 (0.42)	7 (2)	13 (0.58)	21 (0.51)	23 (79)
Univ Maryland, USA	27	11 (1)	5 (0.78)	16 (1.4)	7 (0.77)	7 (0.75)	16 (59)
Univ Toronto, Canada	26	12 (1)	5 (0.78)	19 (1.3)	3 (0.85)	3 (0.83)	15 (58)
Univ Colorado, USA	26	12 (1)	26 (0.42)	9 (1.7)	25 (0.46)	30 (0.39)	20 (77)
Univ Penn, USA	24	14 (0.93)	16 (0.5)	12 (1.4)	11 (0.62)	14 (0.55)	17 (71)
Univ N Carolina, USA	22	15 (0.85)	16 (0.5)	19 (1.3)	13 (0.58)	9 (0.63)	15 (68)
Univ Wisconsin, USA	22	15 (0.85)	26 (0.42)	16 (1.4)	9 (0.66)	9 (0.63)	16 (73)
Univ Warwick, UK	22	15 (0.85)	149 (0.14)	9 (1.7)	21 (0.5)	24 (0.47)	20 (91)
Georgia State Univ, USA	22	15 (0.85)	42 (0.35)	12 (1.4)	25 (0.46)	24 (0.47)	17 (77)
George Mason Univ, USA	21	19 (0.81)	57 (0.28)	12 (1.4)	13 (0.58)	14 (0.55)	17 (81)
Univ Amsterdam, Netherlands	21	19 (0.81)	12 (0.57)	27 (1.1)	21 (0.5)	14 (0.55)	13 (62)
Univ Cambridge, UK	21	19 (0.81)	42 (0.35)	16 (1.4)	38 (0.35)	30 (0.39)	16 (76)
Stanford Univ, USA	21	19 (0.81)	10 (0.64)	29 (1)	19 (0.54)	21 (0.51)	12 (57)
Natl Univ Singapore, Singapore	20	23 (0.77)	4 (0.85)	58 (0.68)	8 (0.7)	8 (0.71)	8 (40)
Univ Durham, UK	19	24 (0.73)	10 (0.64)	40 (0.85)	11 (0.62)	9 (0.63)	10 (53)
Univ Alberta, Canada	19	24 (0.73)	12 (0.57)	34 (0.94)	13 (0.58)	14 (0.55)	11 (58)
Univ Virginia, USA	18	26 (0.7)	57 (0.28)	25 (1.2)	51 (0.31)	76 (0.24)	14 (78)
York Univ, Canada	18	26 (0.7)	42 (0.35)	27 (1.1)	27 (0.42)	24 (0.47)	13 (72)
Copenhagen Sch Econ & Business Adm, Denmark	17	28 (0.66)	26 (0.42)	34 (0.94)	27 (0.42)	27 (0.43)	11 (65)
Northwestern Univ, USA	17	28 (0.66)	16 (0.5)	40 (0.85)	38 (0.35)	49 (0.31)	10 (59)
Univ Missouri, USA	17	28 (0.66)	149 (0.14)	19 (1.3)	51 (0.31)	49 (0.31)	15 (88)

TP: the number of total publications; TPR (%): the rank and share in total publications; SPR (%): the rank and percentage of single institute publications; CPR (%): inter–institutionally collaborative publications; FAR (%): first author publications; RPR (%): corresponding author publications in total publications; CPR (%): internationally collaborative publications.

entrepreneurship research. This study finds three reasons for researching the entrepreneurship topic. First, much technical information is ultimately embodied in products and services, and entrepreneurship is a mechanism by which society converts technical information into these products and services. Next, entrepreneurship is a mechanism through which temporal and spatial enhance efficiencies in an economy society. Finally, the entrepreneurship can sustain different sources of change in a capitalist society. The result finding four issues of innovation, entrepreneurship capital, corporate culture, and economic growth are the most popular issues in the research entrepreneurship field. The results shows top ten productive institutes is University of Nottingham, UK; Indiana University, USA; Max Planck Inst Econ, Germany; University of Minnesota, USA; Babson College, USA; Harvard University, USA; Rensellaer Polytech Institute, USA; University of Illinois, USA; Case Western Reserve University, USA; and University of Nottingham, UK. This study will help researchers realize the panorama of global research entrepreneurship, and establish further research direction.

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