

# APPLICATION OF THE BIBLIOMETRICS TO SYSTEMATIZE THEMES AND TOPICS IN BORN GLOBAL STARTUPS RESEARCH

## ỨNG DỤNG PHƯƠNG PHÁP TRẮC LƯỢNG THƯ MỤC ĐỀ HỆ THỐNG HOÁ CHỦ ĐỀ NGHIÊN CỨU VỀ CÔNG TY KHỞI NGHIỆP TOÀN CẦU

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### ABSTRACT

During the past decades increased attention has been given to the growing number of new and young firms that choose to compete in the international marketplace. In spite of early internationalization and limited resources, many Born Globals grew quickly, strongly and achieved remarkable achievements. The strong growth of Born Global has had a strong impact on the global economy in recent years and is expected to have even more powerful effects in the future. Since then, we have conducted research on Born global issues through the analysis of research papers related to Born Global. To evaluate the results of the global scientific research on Born Global, we used a bibliometric approach to understand phenomena and trends from 1994 to 2022. There are 575 related articles and reviews were included in the final analysis. Our analysis includes conceptual structure, intellectual structure with social structure of the problem. The information about the author, source, and country is also reviewed and presented visually.

**Keywords:** Born global; SMEs; Systematic Review; Bibliometric

### TÓM TẮT

Trong những thập kỷ gần đây, việc gia tăng số lượng các công ty khởi nghiệp toàn cầu, những doanh nghiệp dù còn non trẻ đã chọn tham gia cạnh tranh trên thị trường quốc tế ngay từ những ngày đầu thành lập đã dành được sự chú ý đặc biệt. Bất chấp việc quốc tế hóa sớm và nguồn lực có hạn, nhiều công ty khởi nghiệp toàn cầu đã phát triển nhanh chóng, mạnh mẽ và đạt được những thành tựu nổi bật. Sự phát triển mạnh mẽ của các công ty khởi nghiệp toàn cầu đã tạo ra ảnh hưởng đáng kể đến nền kinh tế toàn cầu trong những năm gần đây và được dự đoán sẽ có tác động còn lớn hơn trong tương lai. Xuất phát từ bối cảnh đó, nhóm tác giả đã tiến hành nghiên cứu về các vấn đề liên quan đến công ty khởi nghiệp toàn cầu thông qua phân tích các công trình nghiên cứu có liên quan. Để đánh giá kết quả nghiên cứu khoa học toàn cầu về công ty khởi nghiệp toàn cầu, nhóm tác giả đã áp dụng phương pháp phân tích trắc lượng thư mục để hiểu các nội dung và xu hướng xuất bản từ năm 1994 đến 2022. Có 575 bài viết và bài đánh giá liên quan được sử dụng trong bản phân tích cuối cùng. Bản phân tích bao gồm cấu trúc khái niệm, cấu trúc tri thức và cấu trúc xã hội của các chủ đề nghiên cứu. Thông tin về tác giả, nguồn và quốc gia cũng được xem xét và trình bày trực quan sinh động.

**Từ khóa:** Công ty khởi nghiệp toàn cầu; Công ty vừa và nhỏ; Tổng quan hệ thống; Trắc lượng thư mục.

## 1. Introduction

The concept of Born Global encompasses business organizations that, right from their inception, strategically leverage resources and target markets across multiple countries to gain significant competitive advantages (Oviatt & McDougall, 1994). This distinct

type of firm diverges from those following a gradual internationalization path, which

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aligns with the principles of the internationalization process theory. As per this theoretical framework, corporations initiate their foray into international markets by partnering with autonomous agents. Subsequently, they establish their own sales and production infrastructure, gradually augmenting their global footprint. These enterprises adopt a learning approach based on experience, commencing their international endeavors by targeting markets that are culturally familiar and geographically proximate. This methodical path towards internationalization sharply contrasts with strategies characterized by swift entry and rapid expansion. As a result, the theory of the internationalization process fails to adequately explain the accelerated international expansion observed in Born Global firms.

Furthermore, Born Global firms frequently operate within the realms of technology and knowledge-intensive industries, setting them apart from conventional international enterprises that typically engage in labor-intensive or small-scale manufacturing sectors (Paul & Rosado-Serrano, 2019). For small and medium-sized enterprises (SMEs) to achieve success in the global market, internal competencies and capabilities emerge as the most crucial determinants (Knight & Cavusgil, 2004; Zahra et al., 2000).

Currently, with the development of science and technology, internationalization of enterprises has become a common phenomenon. More and more multinational companies are being born, which emphasizes the importance of globalization. Since then, the need for research and practice to understand the factors affecting the success of global businesses has increased. On the other hand, there are more and more studies on international businesses or the

internationalization processes of businesses worldwide. The studies of many authors, documents and sources cited on Born Global provide an overall perspective on the development trend of Born Global. From there, readers can analyze and learn intuitively aspects of Born Global.

Our current paper focuses on the main topic related to the evolution of Born Globals through some sub-periods, in which the earlier internationalization Firm, International new ventures and Global start-up play an essential role. As far as we consider, current research is the pioneering effort to combine systematic literature and bibliographic analysis on Born Global and some factors governing it. Consequently, we can address the following research agendas:

RQ1: What are the most cited sources of documents, journals, and authors of Born Global?

RQ2: What is the trend in the distribution of the country's scientific production related to Born Global?

RQ4: What are the most relevant affiliations related to Born Global?

RQ5: How efficient are the partnerships among top universities to research Born Global?

RQ6: What is the publication and citation trend in current literature of Born Global?

RQ7: What are the factors accounting for author collaboration?

RQ8: What are the most frequent keywords of Born Global?

RQ9: How to measure the concern and interest in Born Global through the co-occurrence matrix?

and RQ10: How have the most popular themes explained the evolution of Born Global?

Current research is distinct from existing one in the following ways. First, we are the first researcher to look into the impact of Born Global's growth on the global market and the evolution of Born Global through bibliometric analysis and answer distinct RQs. Also, we significantly identify the main keywords related to Born Global to provide research directions for future studies.

## 2. Procedure of data collection and review method

For data collection, we utilized the WoS1 database and employed the main keyword "Born Global," narrowing the search to English articles published up until 2022. This comprehensive approach ensured the inclusion of all relevant articles. WoS is a widely used and trusted source of bibliographic data (Zupic & Čater, 2015) and possesses the oldest and most extensive records of citation indexes (Ellegaard & Wallin, 2015). The dataset we acquired for analysis included various elements such as article title, article type, publisher name and address, keywords, abstract, number of citations, journal name, authors, institutional affiliations, year of publication, volume, issue number, and a list of cited references (Zupic & Čater, 2015). Following the search, we obtained 4862 results, and through subject-to-content analysis facilitated by the ASREVIEW qualitative analysis software, we extracted keywords and summaries. This process aided in identifying synonyms, alternative phrasing, and combinations related to "early globalization," which helped in identifying additional relevant articles for the project. By utilizing content analysis software, we conducted word searches and analyzed word frequency to gain insights. Consequently, we identified additional keywords for this study, including "MSES," "international new

ventures," "instance international," "Global start-ups," and "Born-globalness."

Once all the keywords were identified, a subsequent search was conducted in the WoS database using the Boolean operator "or" between the keywords. The search specifically targeted the "Title, abstract, and keywords" fields to ensure relevance. However, only journal articles were included in this process due to their high credibility among academics and practitioners, as they represent the majority of peer-reviewed and highly cited contributions. Consequently, conference proceedings, books, book reviews, and conference abstracts were excluded from consideration. Additionally, the study focused exclusively on English articles published until 2022. This filtering process resulted in a total of 3328 articles retrieved for further analysis. Data extraction and analysis were carried out during the second semester of 2022.

To standardize the data, the measure of association strength was utilized, in line with the theoretical and empirical findings of Eck and Waltman (van Eck & Waltman, 2010). This particular measure was deemed the most appropriate for normalizing cooccurrence data. The entire network was then partitioned into distinct sub-networks through the application of a clustering algorithm for community detection, as emphasized by Cobo (Cobo et al., 2011). A community, or cluster, was defined as a subset of nodes with dense interconnections compared to the remaining network (Newman & Girvan, 2004). The algorithm employed for this purpose was Walktrap, developed by Pons and Latapy (Pons & Latapy, 2005). As described by its creators, Walktrap utilizes random walks to measure the similarity between vertices, offering several notable advantages such as effectively capturing the community structure of a network, efficient

computation, and utilization within an agglomeration algorithm to determine the community structure efficiently. Importantly, this community detection algorithm displayed superior performance in identifying communities, even when faced with high values of the mixing coefficient (Orman & Labatut, 2009).

### 3. Results

#### 3.1. Descriptive analysis

Table 1 presents the key figures and statistics pertaining to the analyzed collection of Born Global documents. Following an extensive research process, a total of 575 documents were gathered that were relevant to the Born Global topic. Upon examining the authorship pattern, it was observed that these documents were authored by 192 scholars, with an average of 0.569 documents per author. Notably, 73 of these documents were solely authored by a single individual. Initial insights can be derived by considering the ratio of co-authors per document, which stands at 2.5, along with the percentage of international co-authorships, which amounts to 36.87%. Furthermore, the collective documents received a cumulative total of 18,431 citations, resulting in an average citation rate of approximately 4.921 citations per publication per year.

Table 1: *Description analysis*

| Description                        | Results   |
|------------------------------------|-----------|
| <b>MAIN INFORMATION ABOUT DATA</b> |           |
| Timespan                           | 1994:2022 |
| Sources (Journals, Books, etc)     | 192       |
| Documents                          | 575       |
| Annual Growth Rate %               | 12.1      |
| Document Average Age               | 7.14      |
| Average citations per doc          | 56.65     |

| Description                        | Results |
|------------------------------------|---------|
| Average citations per year per doc | 4.921   |
| References                         | 18431   |
| <b>DOCUMENT TYPES</b>              |         |
| article                            | 449     |
| article; early access              | 19      |
| article; proceedings paper         | 4       |
| proceedings paper                  | 78      |
| review                             | 22      |
| review; early access               | 3       |
| <b>DOCUMENT CONTENTS</b>           |         |
| Keywords Plus (ID)                 | 850     |
| Author's Keywords (DE)             | 1385    |
| <b>AUTHORS</b>                     |         |
| Authors                            | 1011    |
| Author Appearances                 | 1438    |
| Authors of single-authored docs    | 73      |
| <b>AUTHORS COLLABORATION</b>       |         |
| Single-authored docs               | 83      |
| Documents per Author               | 0.569   |
| Co-Authors per Doc                 | 2.5     |
| International co-authorships %     | 36.87   |

Figure 1 illustrates the distribution of documents published from 1994 to 2022, categorized into two periods: pre-2013 and post-2013. Notably, a significant growth trend is observed during the second period of analysis. On average, there was a 21% annual growth rate. In contrast, Figure 2 portrays the trend of annual citations per year, which exhibits an unstable pattern. Particularly, the number of citations in 1998 was nearly zero. However, within a span of two years, the citation count surged dramatically to approximately 50 citations.

### Annual Scientific Production

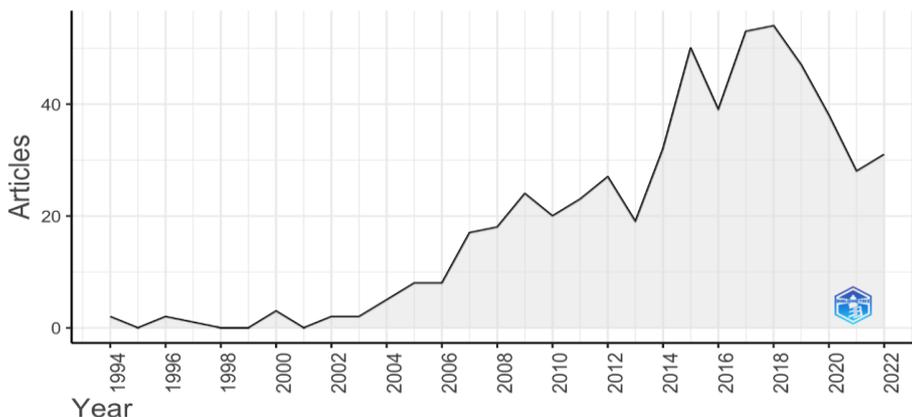


Figure 1: Annual Scientific Production

### Average Article Citations per Year

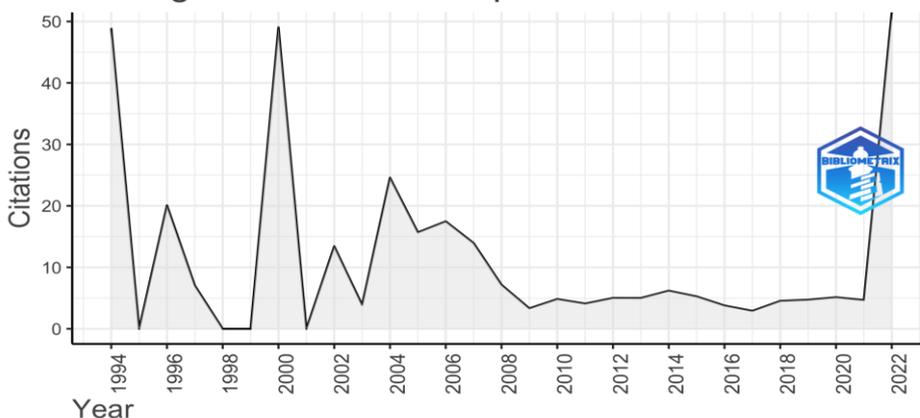


Figure 2: Average Article Citations per Year



Figure 3: Most Relevant Sources

Figure 3 shows us the top ten journals that have the most Born Global documents. The most cited source was the International Journal of Business Review with 46 documents, after that was the International Journal of Bank Marketing Review and the Journal of International Entrepreneurship with 32 and 27 documents. The growth of top ten journals over time can be seen in Figure 4.

Figure 5 displays the most cited sources in the Born Global collection. First of all, the Journal International of Business Study was

mentioned about 4527 times in Born Global documents. The second one was the International Business review which was also the second most cited source with 1895 citations. The third one which comes close to the second one was Journal of Business venturing with 1830 citations. We are concerned that the main sources belonging to the technology field specifically refer to information technology.

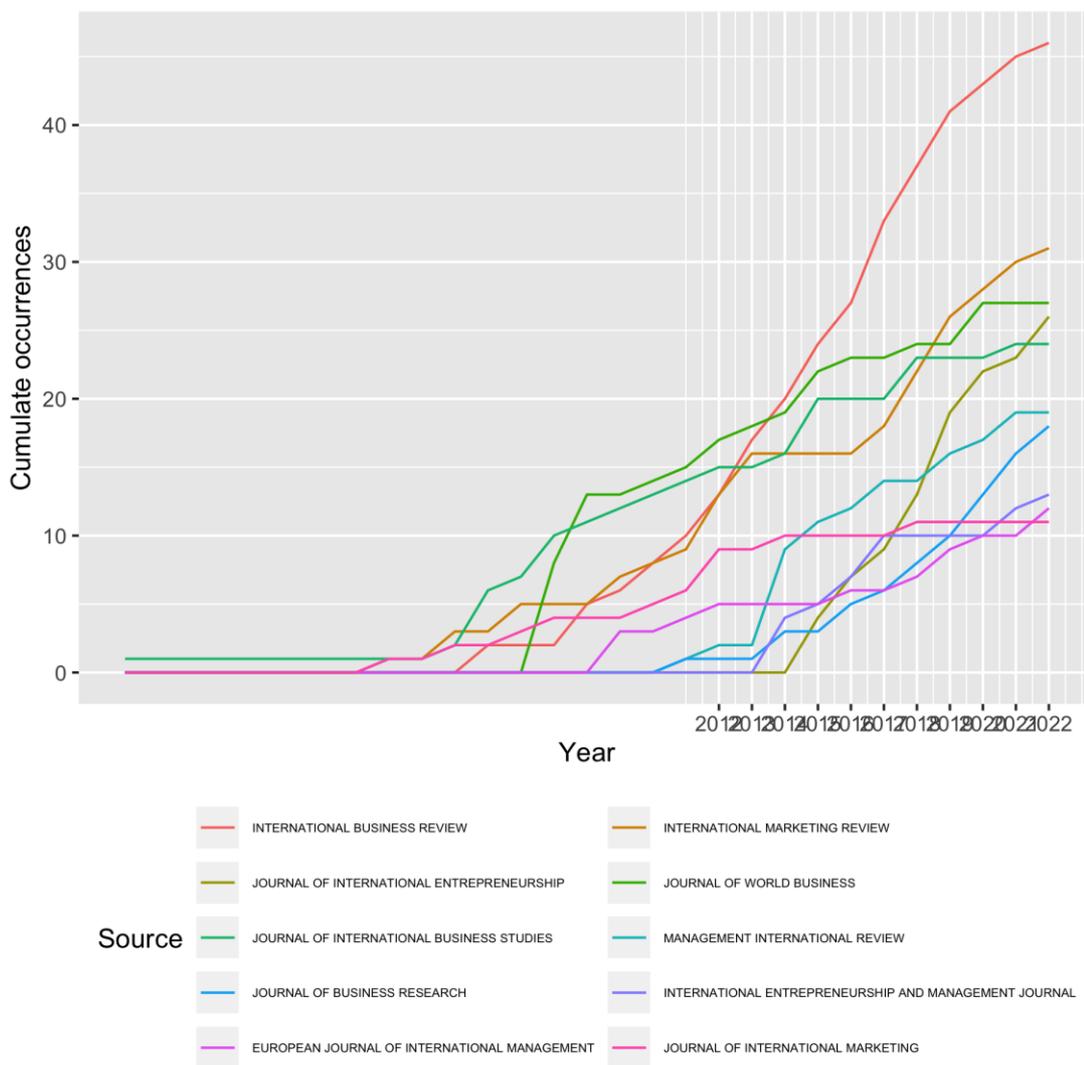


Figure 4: Source Growth

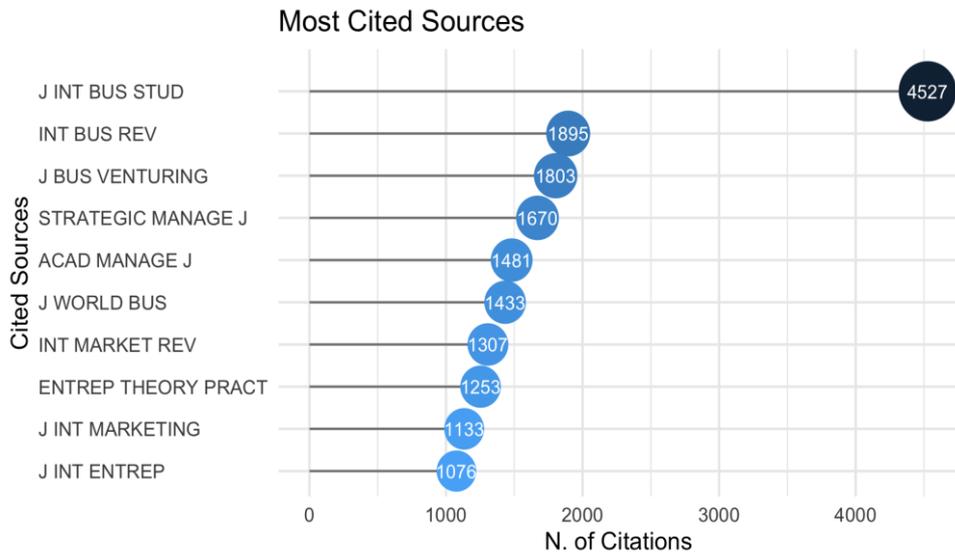


Figure 5: Most Cited Sources

### 3.2. Productivity and Collaboration Networks of Countries and Institutions

Figures 6, 7, 8 show the most active countries in the world when it comes to citations and publications. The USA, a number of European countries, China and Australia were in the first place of the table “Country Scientific Production”. In figure 7,

the most domineering category was The USA which reached 9691 citations. However, these performances may be related to their large populations. Indeed, per average article citations, a number of European countries published more. Rank first of figure 8 was Georgia with 1370 citations. This was followed by Switzerland with 213 citations.

## Country Scientific Production

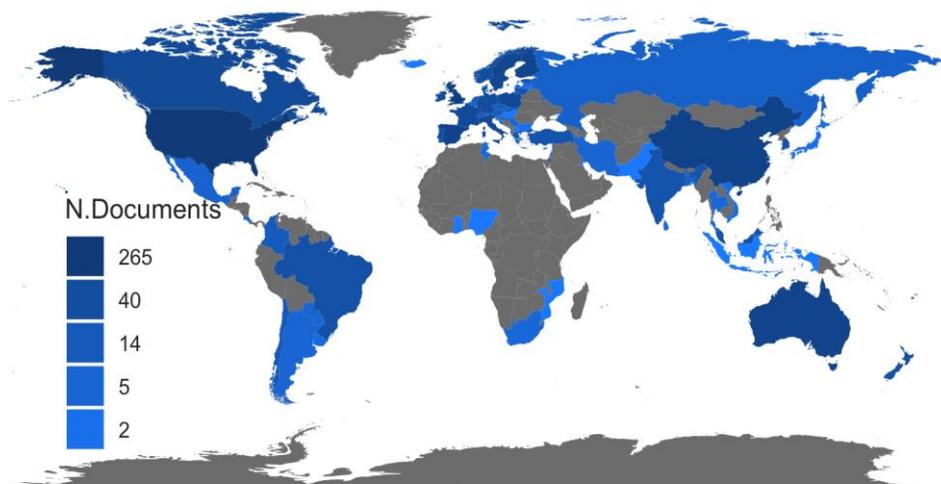


Figure 6: Country Scientific Production

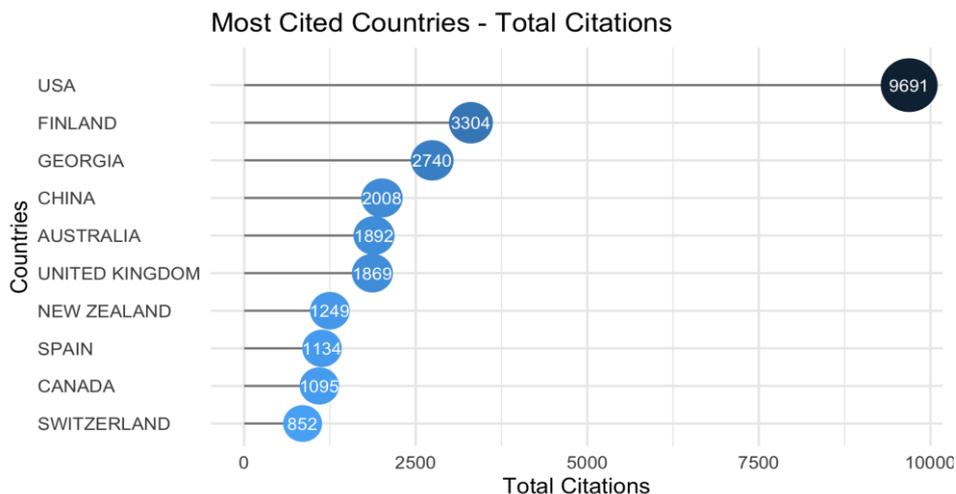


Figure 7: Most Cited Countries - Total Citations

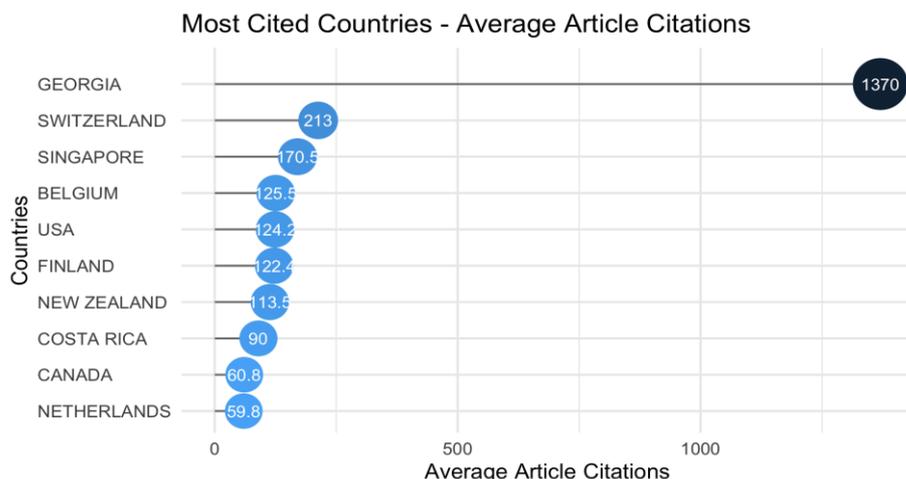


Figure 8: Most Cited Countries - Average Article Citations

The success of the journal was also testified by the increasing number of articles through the decade (Figure 9). Born global can be considered a new field as most countries only started to produce since 2006. Within 26 years, the number of articles published by countries each year tends to increase. Especially, USA was always the main leader of the journal. The last 7 years experienced a significant rise of the United Kingdom whereas the rest of countries' articles were almost constant.

Figure 10 facilitates the evaluation of each country's propensity for collaborative

engagement with others. It provides insights into international collaboration by analyzing the number of documents produced by authors from the same country (termed as single country publications, SCP) and the number of documents produced by authors from different countries (referred to as multiple countries publications, MCP). Our findings reveal that, with the exception of the United Kingdom, prominent countries showcased a higher SCP relative to their corresponding MCP. This suggests a comparatively lower inclination to engage in collaborative efforts with other nations.

## Country Production over Time

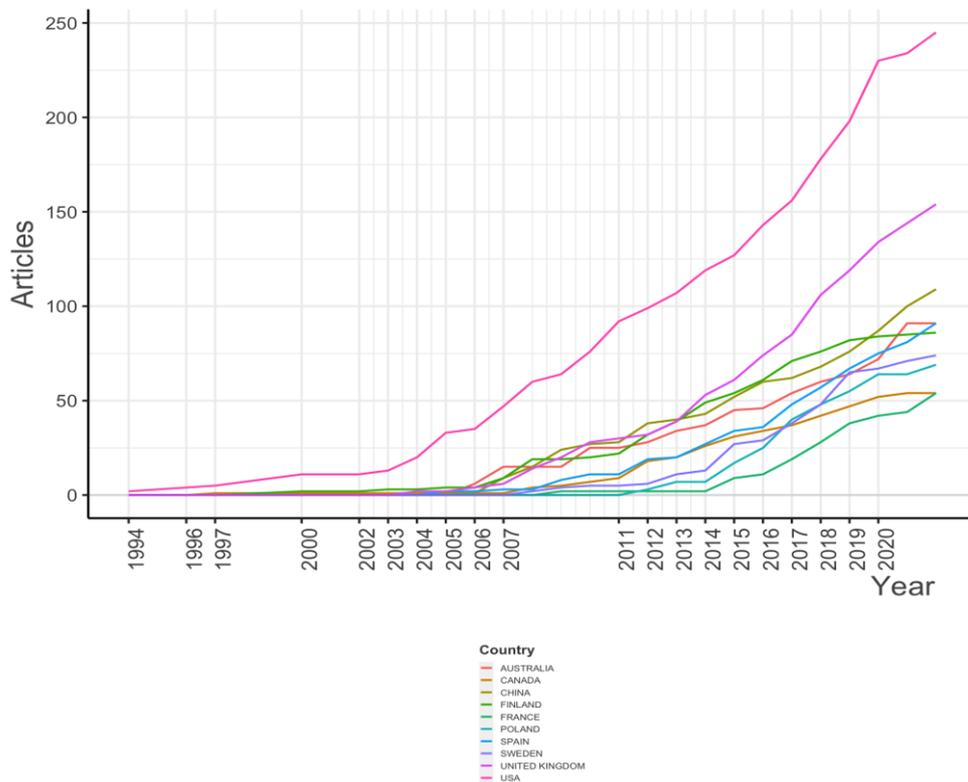


Figure 9: Country Production over Time

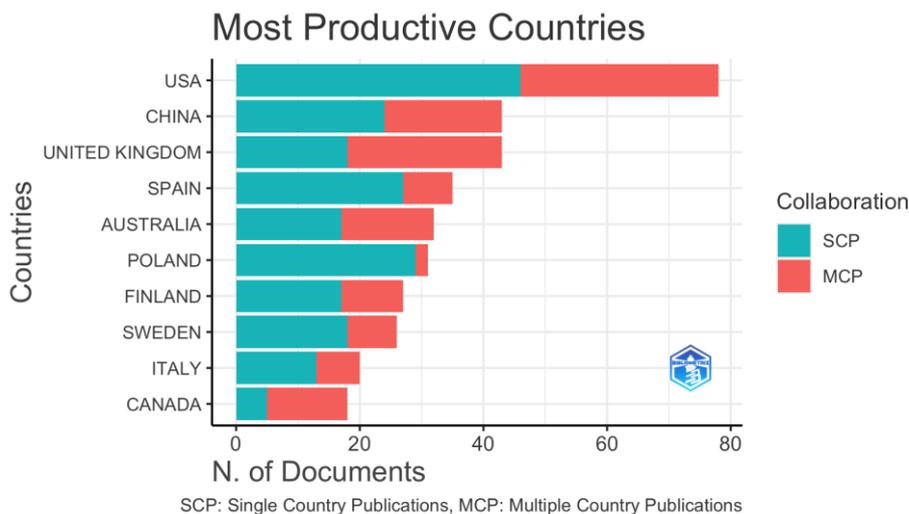


Figure 10: Most Productive Countries

Figure 11 provides a comprehensive overview of country-to-country collaboration. The network is derived from a country  $\times$  country adjacency matrix that

tallies co-authored publications. For the graphical representation, single country publications recorded on the main diagonal of the adjacency matrix have been excluded.

The size of the corresponding labels has been adjusted proportionally to highlight the total number of papers associated with each country. In terms of betweenness centralities, the USA emerges as the country with the highest value, followed by the United Kingdom and China. Notably, authors from the USA exhibited significant collaboration with countries occupying prominent positions in the network, namely Australia,

the United Kingdom, and China. Additionally, connections between the USA and countries in Asia were observed, as well as a link between the USA and Canada, driven by economic and geopolitical ties. Conversely, we identified a closely interconnected community primarily linked to Europe, with the United Kingdom occupying a central position within this network.

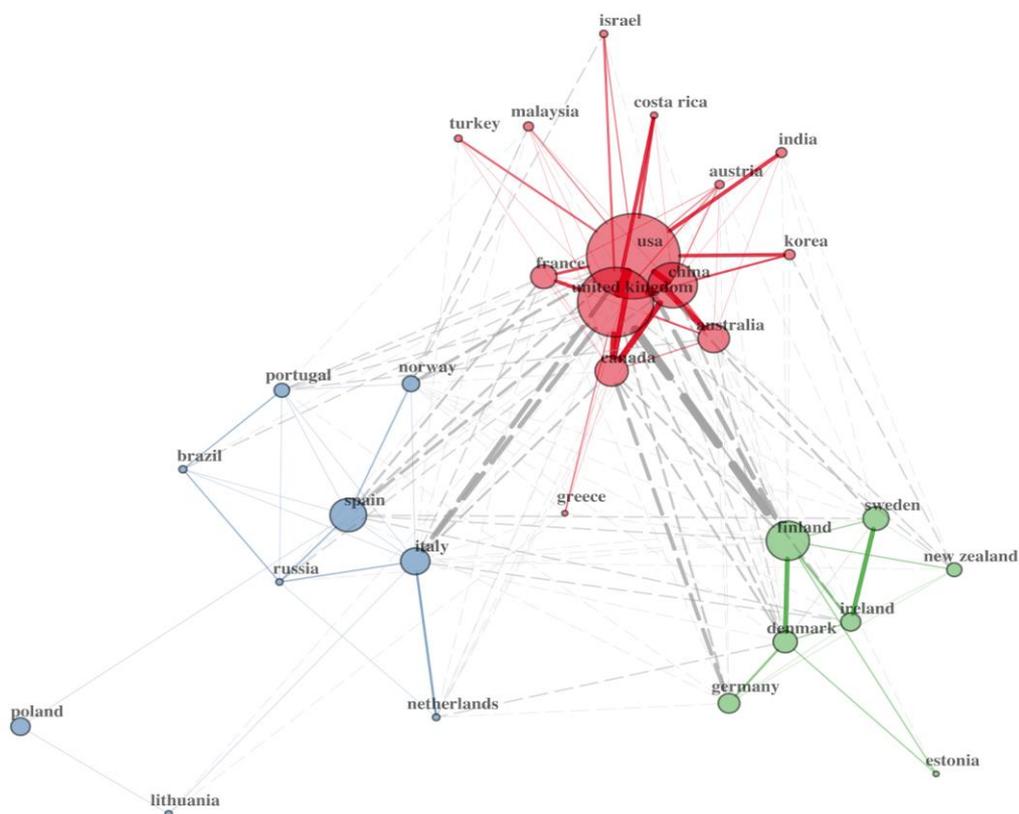


Figure 11: Country Collaboration

Figure 12 presents the top ten most productive institutions based on the total number of publications. The affiliations of authors at the time of publication were taken into account. It is notable that although the USA was one of the most productive countries, none of its universities appeared in the top ten list. Instead, the table predominantly features universities from Europe, which is not surprising considering

their productivity in the field. Figure 13 illustrates the growth of the top ten universities over time. The chart indicates a steady increase in the number of articles published by these universities since 1994. Of particular significance is the substantial surge in articles published by Lappeenranta University Technology in 2016, propelling it ahead of other universities in terms of publication count.

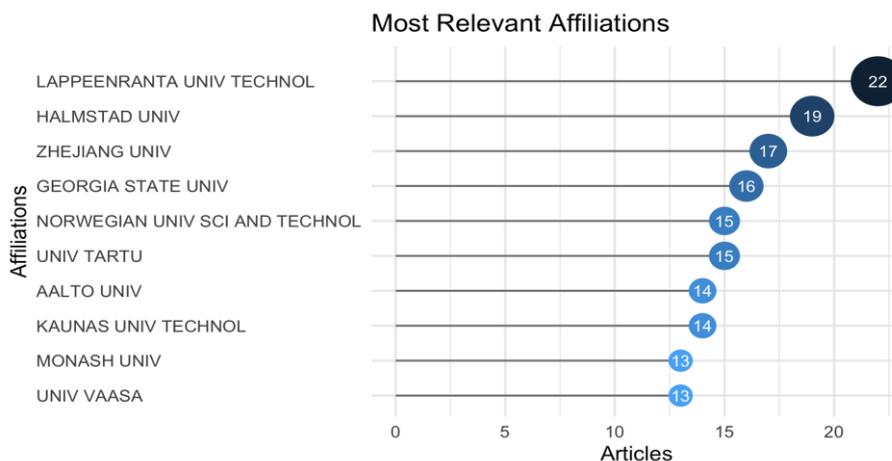


Figure 12: Most Relevant Affiliations

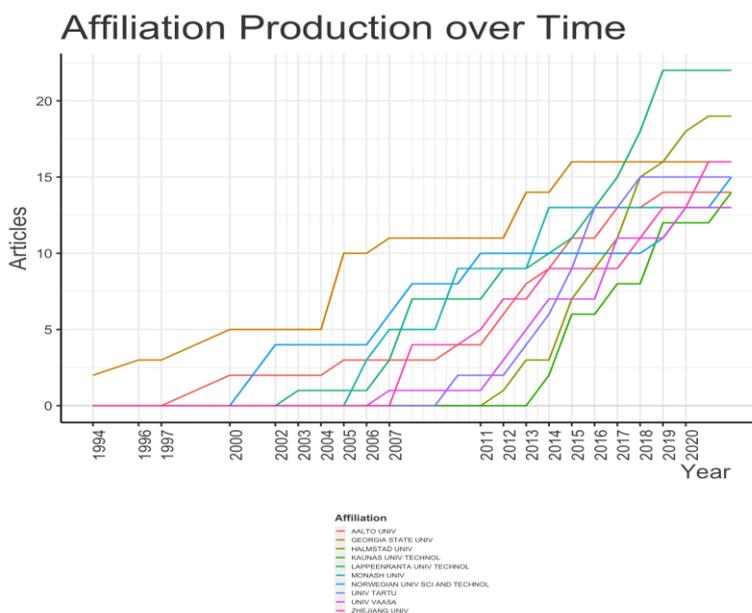


Figure 13: Affiliation Production over Time

Figure 14 depicts the collaboration network among the top institutions. The network was constructed based on the institution  $\times$  institution adjacency matrix, which tallied the co-authored publications. To focus on the most prominent institutions, we selected the first 30 institutions and set a threshold of at least 2 co-authored publications for inclusion. The size of the labels associated with each institution represents the total number of papers

associated with that institution, providing a proportional representation. Additionally, in order to identify groups of institutions exhibiting similar collaboration patterns, a community detection analysis was conducted using the same multilevel approach employed previously.

We noted four different communities. The common point of these communities is that they all have universities from Europe participating. We observed the biggest

community, represented by the Aalto University from Finland. This community was formed by Aalto University, University

of Pavia, University of Seville, University of Glasgow – all from Europe – and other universities from The USA, Australia,...

**Affiliation Collaboration**

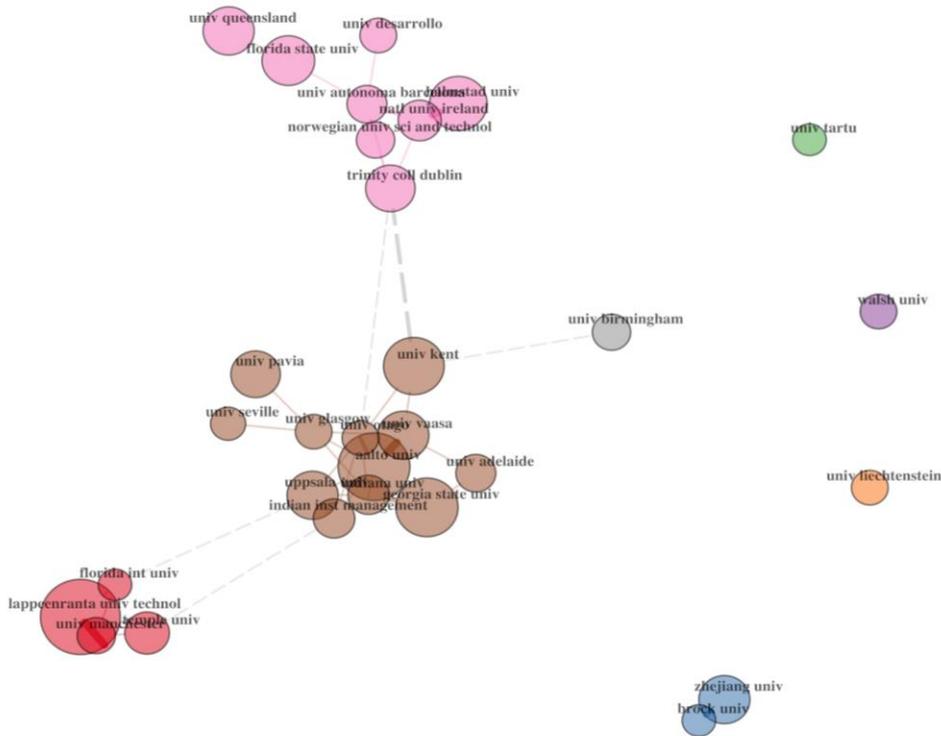


Figure 14: Affiliation Collaboration

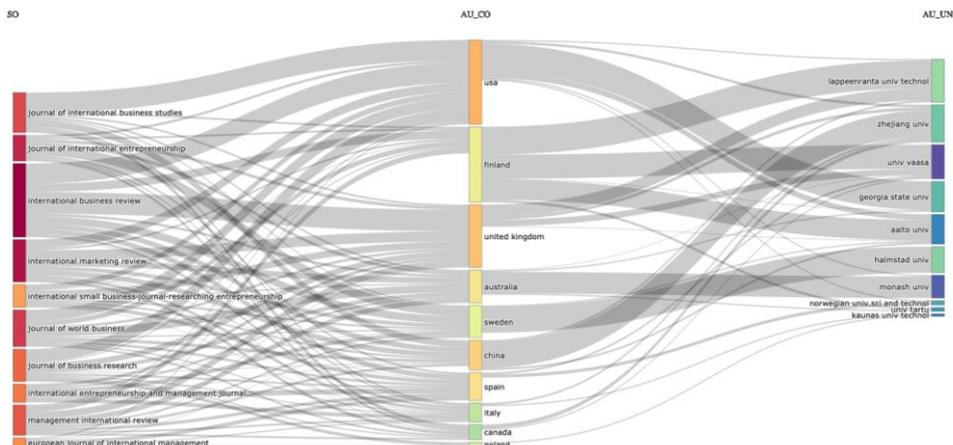


Figure 15: Three-Field Plot

To sum up, a more visualized representation of the top 10 prolific countries and affiliations with the top 10 research journals were summarized by a Sankey plot

(a diagram used for the flow from one set of given characteristics to another) in Figure 15. Specifically, this figure presents the three-fold analysis of article contributions with

countries in the middle, institutions on the right, and publishing sources on the left. Besides, the boxes' height and the connecting lines' thickness indicate the contributions' importance.

**3.3. Highly Contributive Authors, Papers and Citations**

Figure 16 and 17 showcase the list of the ten most productive authors in the field of Born Globals, arranged based on the total number of publications. Evers N. claims the top spot with 12 publications, followed by Andersson with 9 publications and Zhou L with 8 publications. To provide a measure of authors' productivity that considers their actual contributions, the fractionalised

frequency of publications (FTP) is also provided. FTP adjusts the number of publications by taking into account the number of authors involved, thus addressing discrepancies in authors' contributions within single- or multi-authored publications. This metric offers an adjusted number of publications per author, as proposed by Batista et al. (2006) and Vavryčuk (2018). When FTP is considered, Evers N maintains the top position with a value of 4.37, followed by Andersson (4.17) and Zhou L (3.75). Figure 18 visualizes the production of these ten authors, depicting both the number of articles they have published and the corresponding citations they have received.

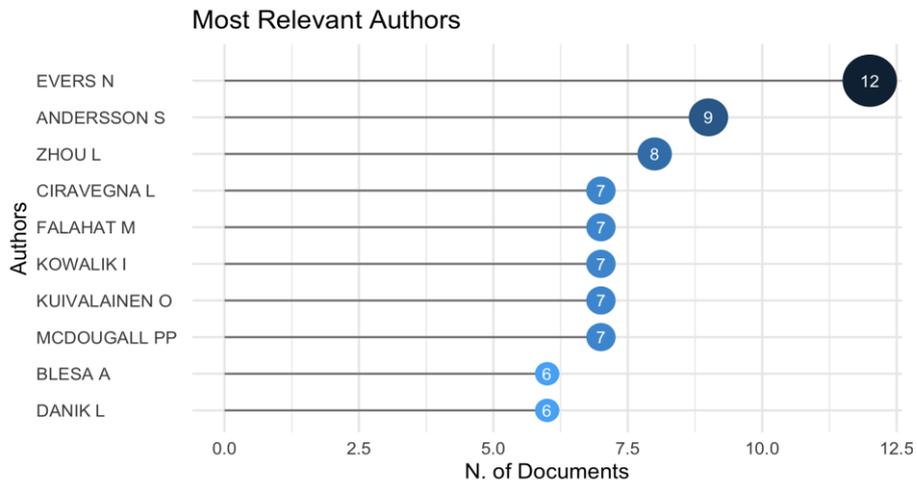


Figure 16: Most Relevant Authors

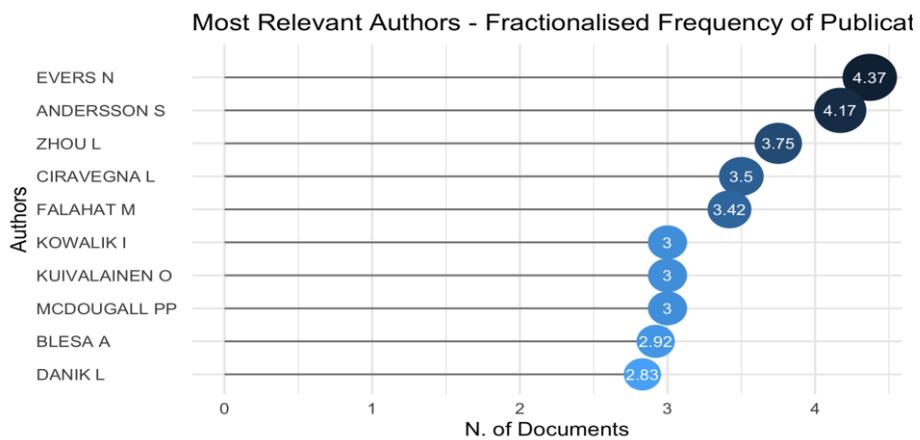


Figure 17: Most Relevant Authors - Fractionalised Frequency of Publications

### Top-Authors' Production over Time

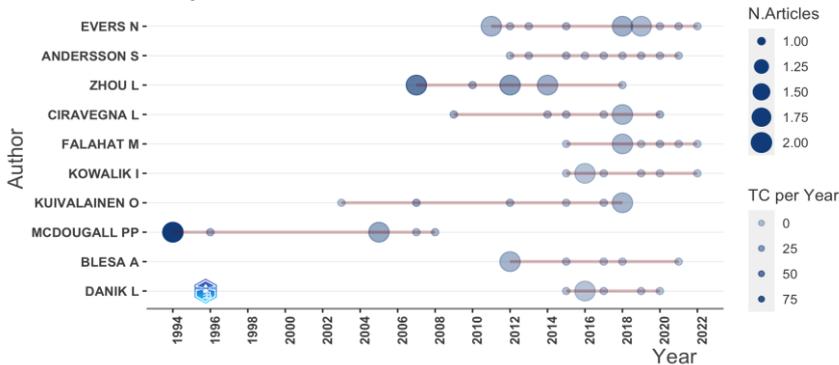


Figure 18: Top Authors' Production over Time

Figure 19 presents the total citations received by authors, revealing a different ranking in terms of impact. Johanson J emerges as the most influential author in the field of Born Globals, with publications garnering 887 citations. Following closely is Oviatt BM with 715 citations, while Knight Ga secures the third position with 703 total citations. This observation is further corroborated when examining the ten most cited publications in Born Globals, as depicted in Figure 20. Knight Ga's publication from 2004 holds the fourth position among the most cited papers in the field, accumulating 1407 citations. The paper authored by Oviatt BM in 1994 stands as the most cited publication in Born Globals, with 1970 citations. It is followed by Zahra Sa.'s paper from 2000, which received 1637 citations.

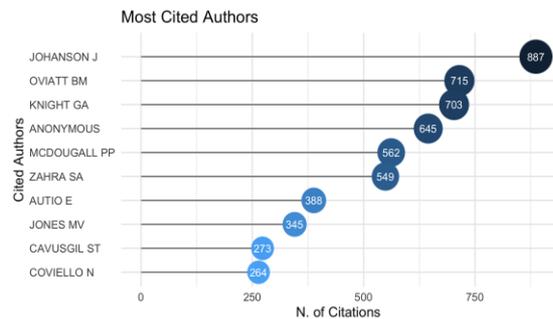


Figure 19: Most Cited Authors

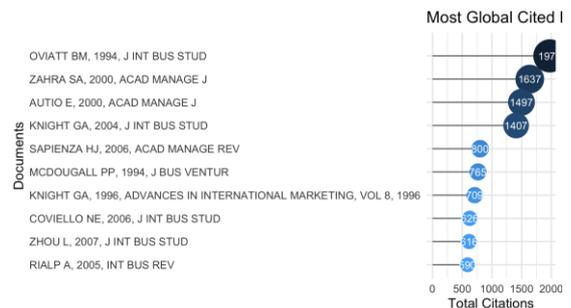


Figure 20: Most Global Cited Documents

The authors were also examined in terms of their collaboration patterns. Scientific collaboration has become a prominent feature of contemporary research, with an increasing number of scholars participating in team-based endeavors rather than working in isolation (Glänzel & Schubert, 2005; Katz, 1997). Co-authorship networks provide a means to analyze collaboration patterns, uncover the social structure within a scientific field, and identify leading scholars. These findings offer valuable insights into

the knowledge creation dynamics within the Born Global field. To understand the collaborative relationships among authors, a co-authorship network was constructed using the author × author adjacency matrix, which tallied co-authored publications. Additionally, a community detection analysis was conducted using the multilevel algorithm to identify distinct groups of connected authors within the network. Figure 21 displays the co-authorship network of Born Globals from 1994 to 2022, revealing fifteen

distinct communities of authors. The largest group comprises five authors: Falahat M, Moen O, Servais P, Madsen TK, and Kraus S. Additionally, there are three groups consisting of three authors each. The first group includes Gerschewski S, Evers N, and Anderson S. The second group comprises Saarenketo S, Kuivalainen O, and Ciravegna L. The last group consists of Zucchella A,

Gabrielsson M, and Gabrielsson P. This finding suggests that these authors frequently collaborated with a diverse range of authors. It also indicates that they did not work with a consistent research team for the articles published on Born Global or had a higher level of collaboration with various researchers in the field.

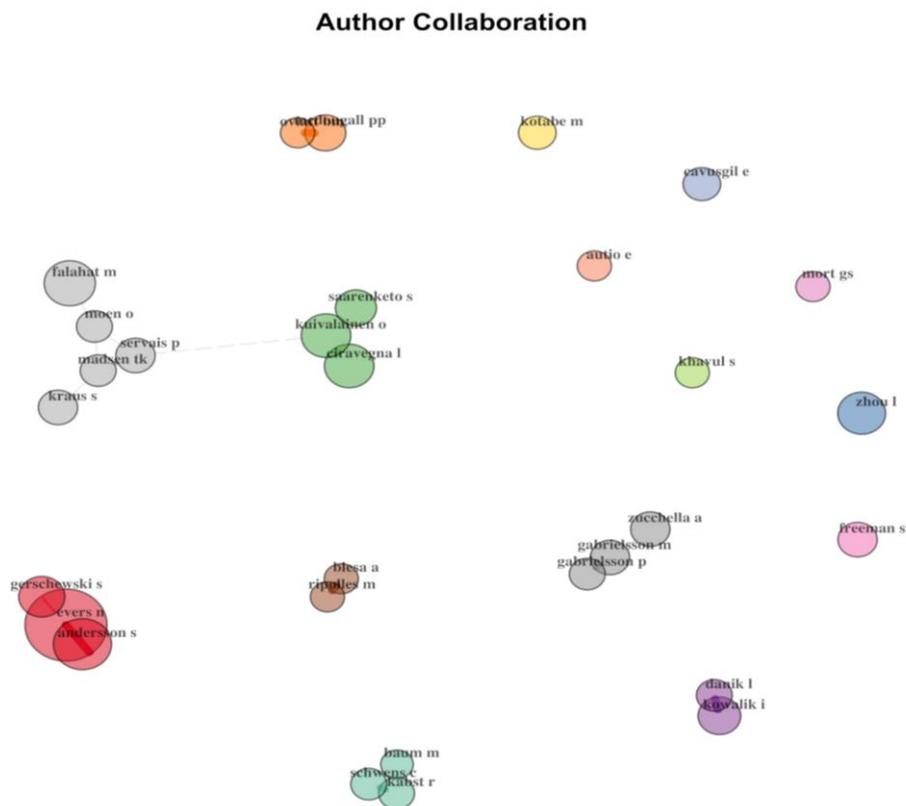


Figure 21: Author Collaboration

### 3.4. Thematic Analysis and Evolution

#### 3.4.1. Keyword Frequency and Trend Topics

In this section, our focus was on analyzing the conceptual framework of publications in the field of Born Globals. This type of analysis provides valuable insights into the topics covered by the journals and helps identify the most significant and recent ones. Understanding the conceptual structure is also beneficial for studying the evolution of research topics over

time (Dumont Oliveira, 2018). By examining the conceptual framework, we gain a deeper understanding of the underlying concepts and theoretical foundations that shape the research in the field of Born Globals.

A term co-occurrence network can be used to represent phrases that appear in a document together, such as keywords, terms taken from titles or abstracts. Each keyword's relative potency is depicted in Figure 22; its evolution over time is depicted in Figure 23.



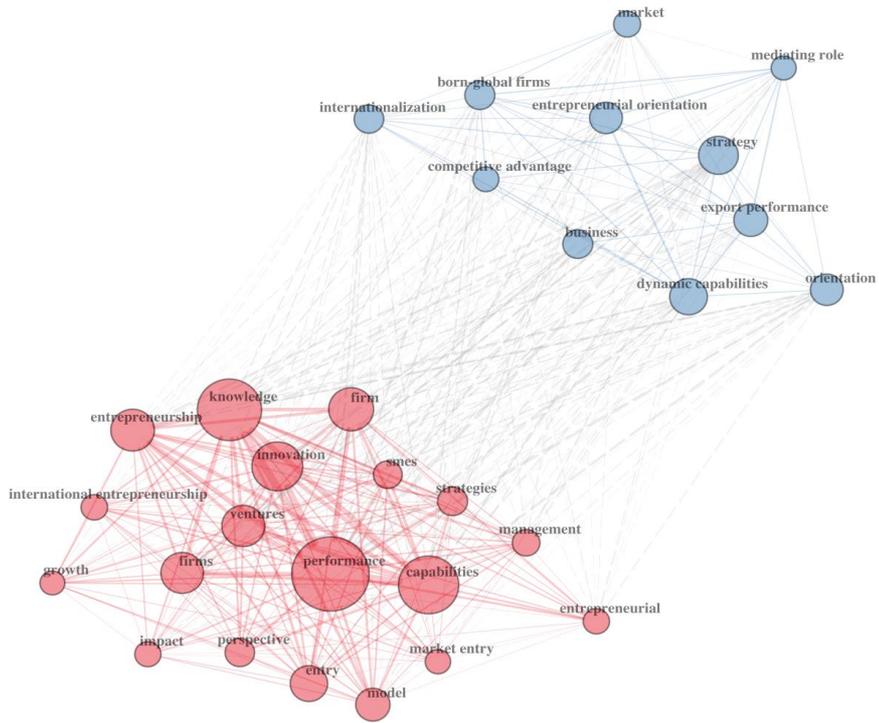


Figure 24: Co-occurrence network

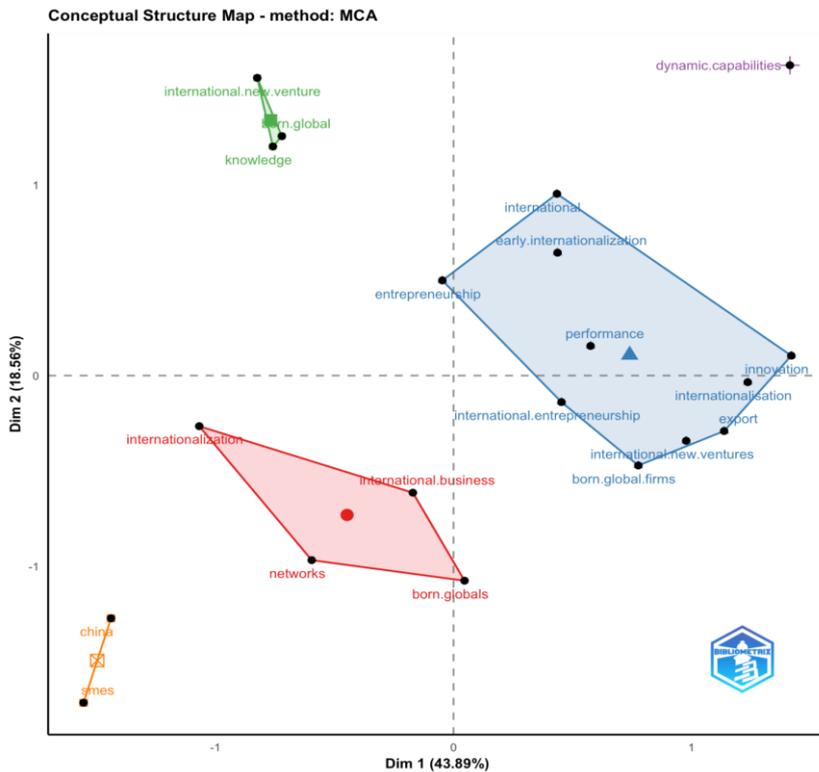


Figure 25: Factorial Analysis

To delve deeper into the analysis, we applied the simple center algorithm (Coulter et al., 1998) to each sub-period co-occurrence matrix. This approach facilitated the detection of subgroups consisting of closely interconnected terms. Each subgroup represents a distinct center of interest or research theme within the analyzed collection. Following this analysis, the results were visualized in a strategic or thematic diagram, as referred to by Cobo (Cobo et al., 2011). Figure 26 specifically highlights the primary research themes that have emerged in the field of Born Global.

With the aim of estimating the main themes' evolution over time, we came to a decision to divide our temporal interval (1994 - 2022) into three main sub-periods, which we considered a normalization of the keywords separately for each sub-period. Besides, we imposed a minimum threshold of 5 occurrences to sort only the most continual keywords. Interestingly, the total occurrences of the keywords composing each proportionally dimensioning topic/theme enhance the readability of the representatives.

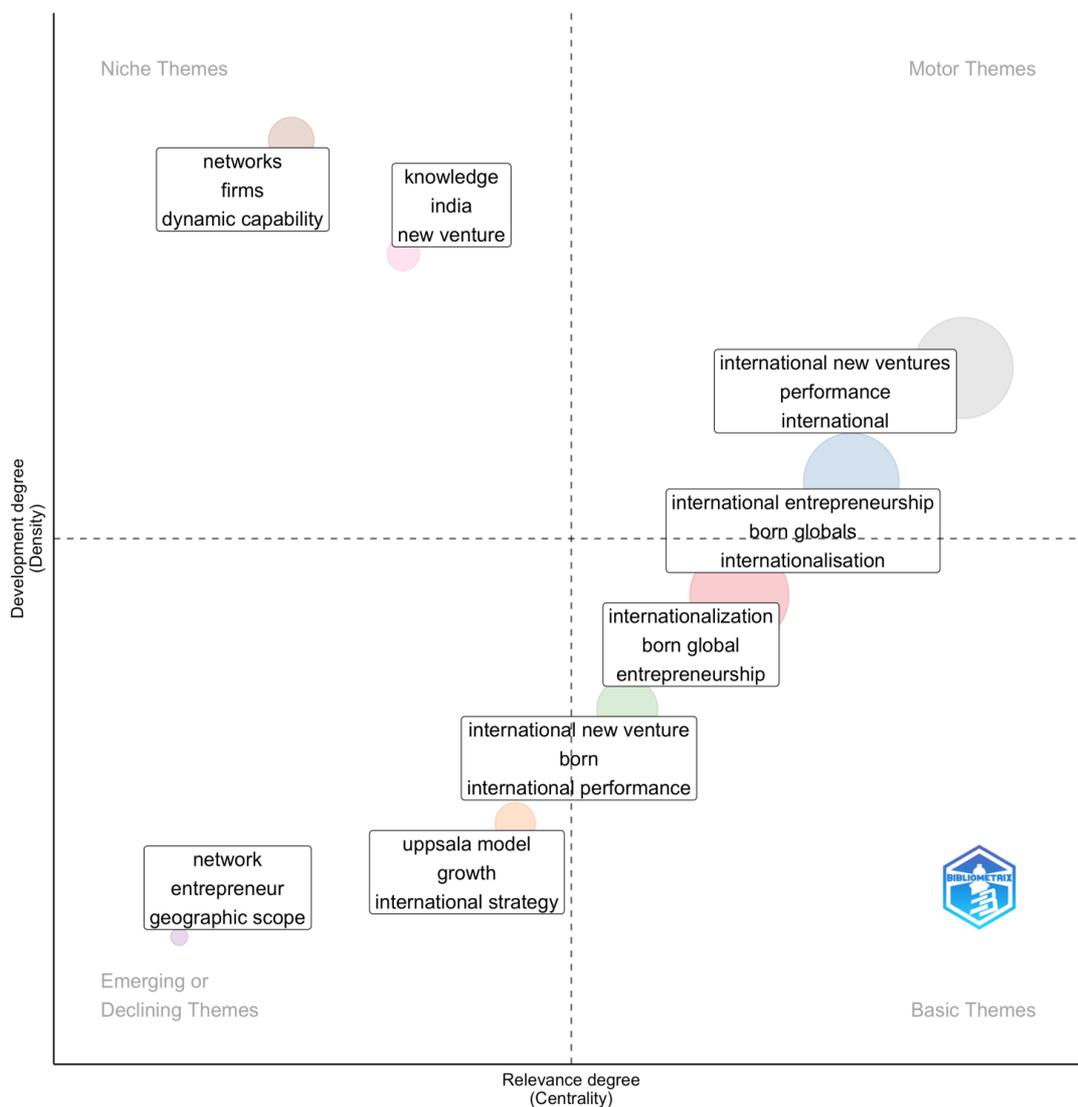


Figure 26: Thematic Map

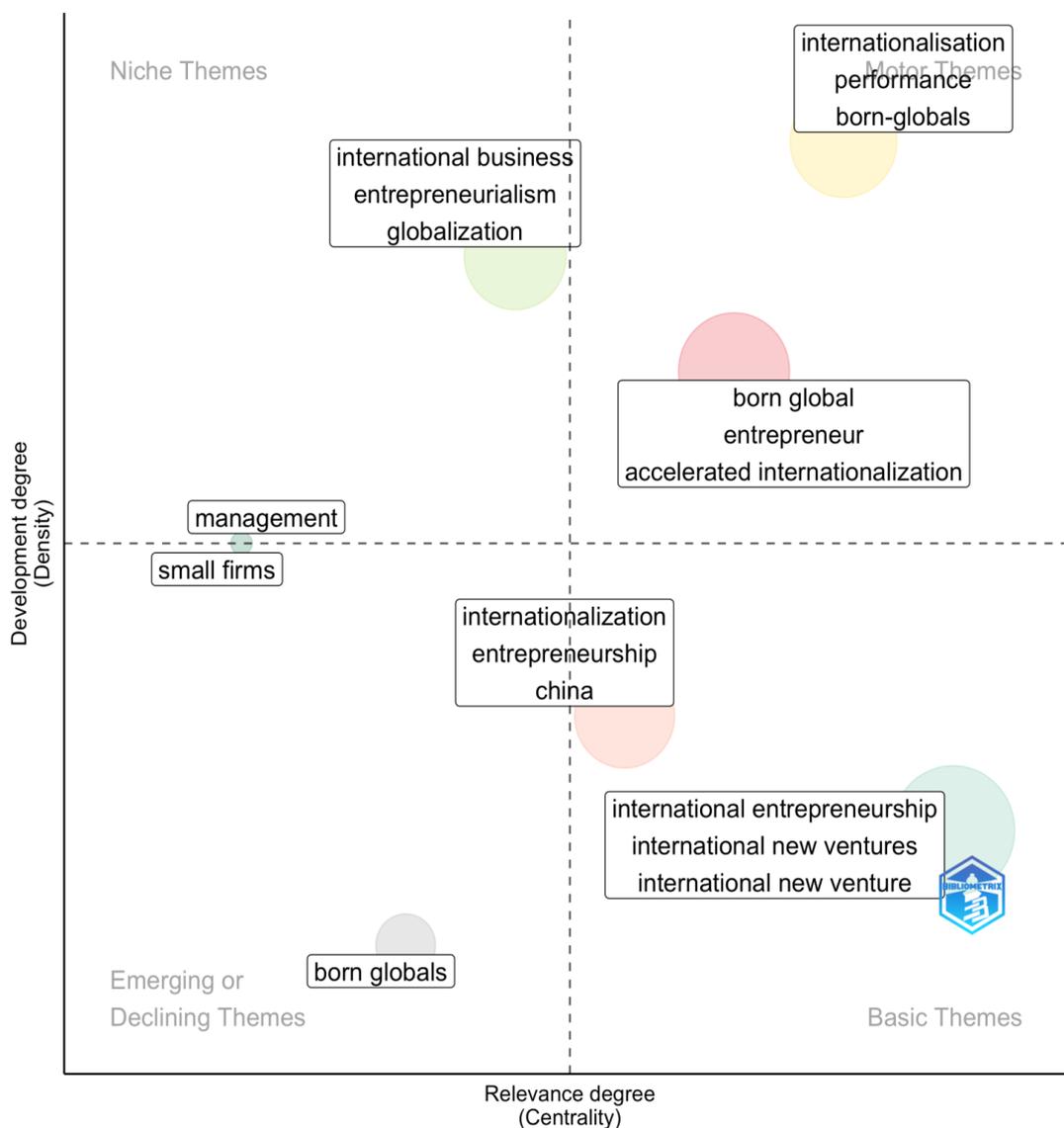


Figure 27: Thematic Evolution (1994-2008)

As we can see from Figure 27, eight main topics appeared in the first sub-period. Different use of the terms in relation to Born Globals is noticed in order to give a description of the research domain.

In the second sub-period (as depicted in Figure 28), we observed a concentration of research efforts on a smaller number of topics. Specifically, there was a notable increase in the number of studies conducted within these focused areas. We observed that

capabilities globalization, innovativeness were an important motor theme of this 2-year. Internationalization born globals consolidated their role as basic themes. When it comes to niche themes, internationalization innovation SME plays a vital role with high density together with low centrality. The figure also paid attention to the knowledge and environment of born global firms in.

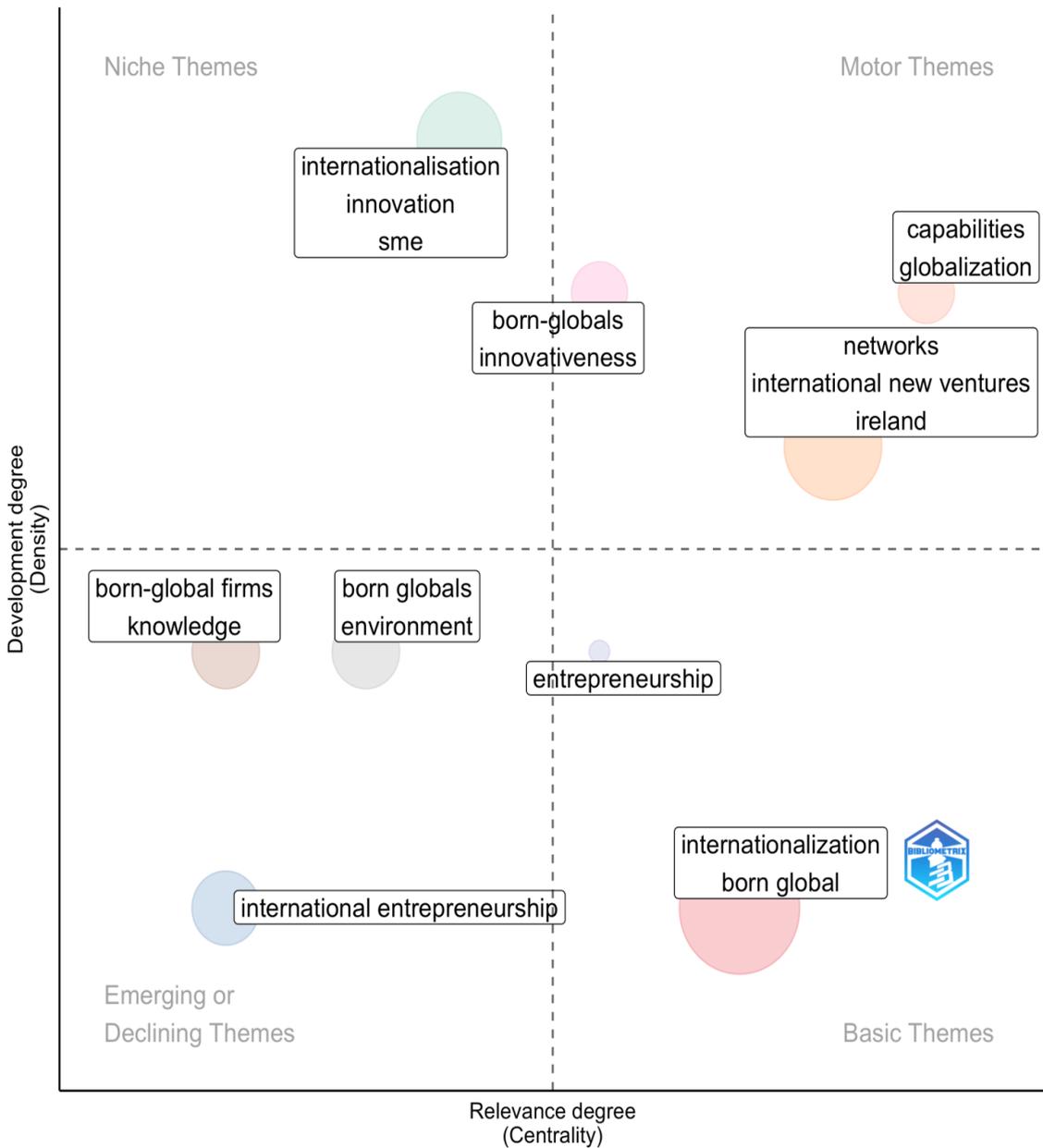


Figure 28: Thematic Evolution (2009-2010)

In the third sub-period (as illustrated in Figure 29), we noticed a distinct distribution of topics. Networks and processes emerged as the predominant theme during this more recent period. This theme can be regarded as specialized compared to the previous decade, indicating a shift in research focus towards the dynamics of networks and various

processes within the Born Global field. The born global performance replaced the old terms with a novel basic theme though. Some new terms appeared in Niche themes and Declining themes such as effectuation, entrepreneurial marketing causation and rapid internationalization.

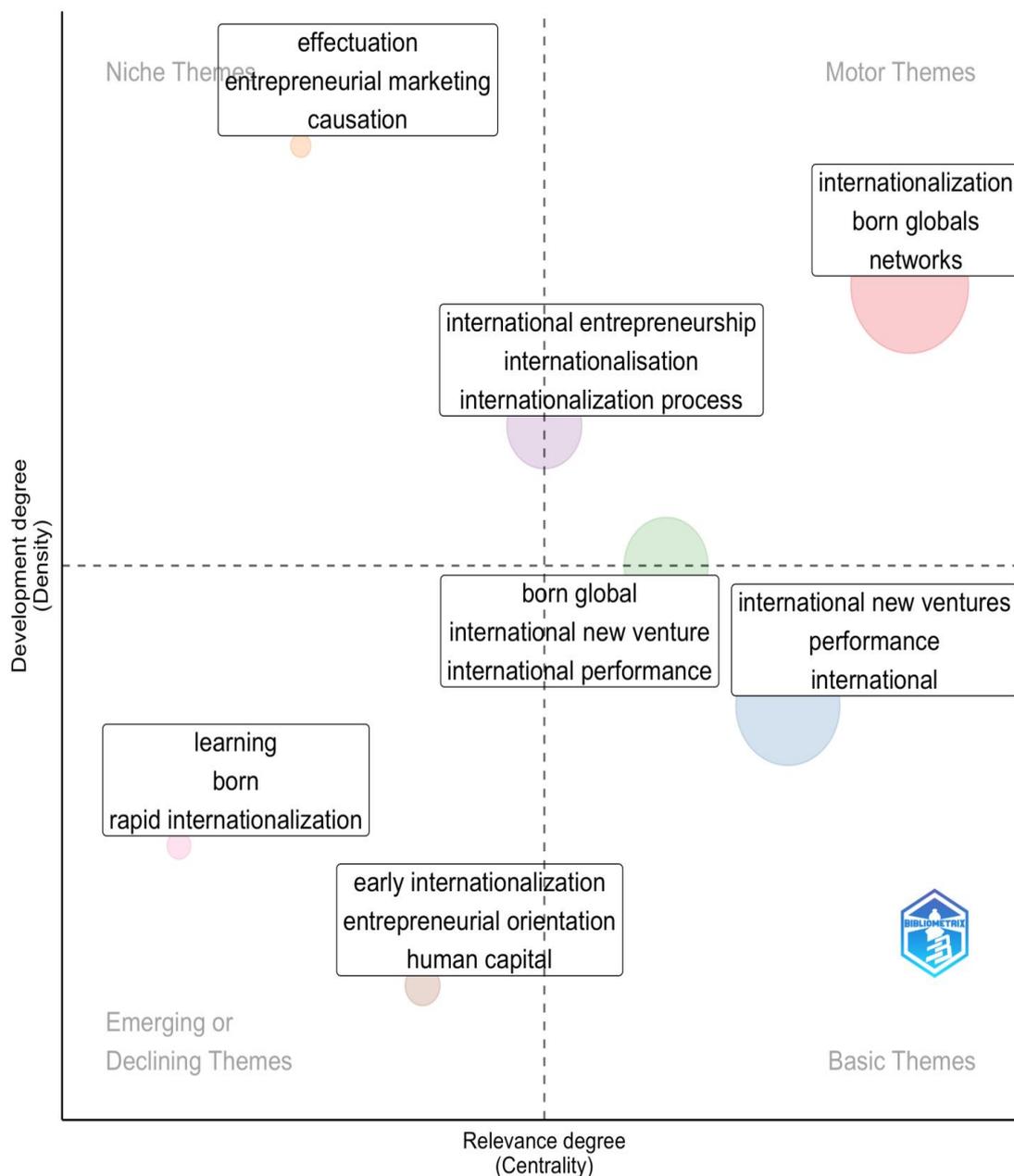


Figure 29: Thematic Evolution (2011-2022)

It is obvious that the evolution of born-global changed and developed over different periods, from the first sub-period to the third sub-period. The Sankey diagram used in Figure 30 somehow indicates visually the overall picture of 3 sub-periods in the process of born-global development. In general, the evolution of born-global

experienced the increase of some terms related to this theme. With 8 main topics appearing in the first sub-period (1994-2008), we can see that 9 topics were gathered in the second sub-period (2009-2010) and had a great impact on the shift of born-global in the final sub-period (2011-2022).

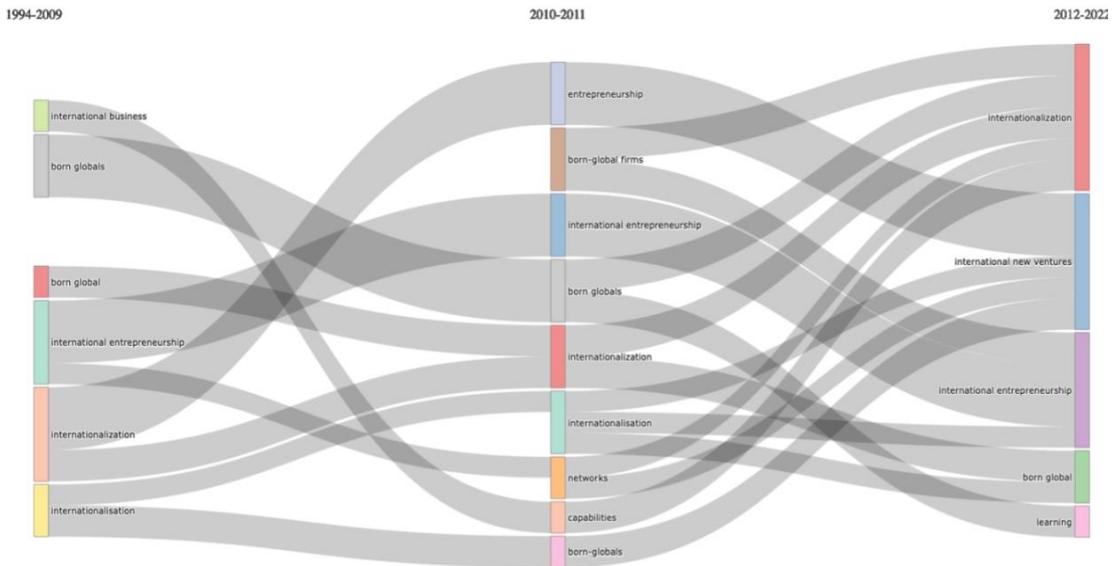


Figure 30: Thematic Evolution

#### 4. Discussion and conclusion

This study aimed to provide a comprehensive review of scientific publications in the field of Born Global through the application of bibliometric analysis. It aimed to achieve several objectives, including identifying prominent themes, prolific scholars, and their contributions, analyzing social networks and collaborations across institutions, countries, and regions over time, and presenting a thematic analysis of the current state and future prospects of the field. This study offers significant contributions to the existing research landscape. One notable contribution is the identification of relevant publishing outlets, with the "International Business Review" emerging as a prominent source based on the findings. This information serves as a valuable reference for researchers seeking suitable venues to publish their research papers.

Additionally, our research findings indicate that while the USA is highly active in the field of Born Global, none of its universities made it to the top ten most productive institutions. Instead, European nations exhibit higher efficiency in terms of productivity. Notably, Lappeenranta University of Technology in Finland leads the list of productive institutions. Furthermore, the USA consistently ranks highest in terms of scientific output in the field of Born Global, underscoring its continued relevance. Moreover, the study reveals that the field of Born Global is evolving with emerging aspects such as "born global" and "SMEs". These findings highlight the importance of further research and development in the field of Born Global. In conclusion, this study offers suggestions for future research directions in the field, paving the way for continued exploration and advancements in the understanding of Born Global phenomena.

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