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Public Sector Entrepreneurship: Scientific Mapping and Research Agenda

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Background and Purpose: The concept of entrepreneurship within the public sector is one of the most fiercely debated areas of entrepreneurial research. It has been studied across several academic disciplines such as in management, public administration and political economy, among others. However, while academic output has increased, we found no prior studies providing a clear mapping of the field. Therefore, this research sought to comprehensively examine all peer reviewed articles on public sector entrepreneurship.
Methods: Using the Scopus scientific database, our analysis included 133 articles from 1982 to 2022. Following a thorough manual review process, we used VOSviewer to provide a mapping of the field, before identifying research gaps and suggesting directions for future research. Our scientific mapping revealed the leading and emerging thematic clusters in the field.
Results: Our results revealed that the leading themes in public sector entrepreneurship include innovation, entrepreneurship, public sector, governance, reinventing government, and public organisations, while emerging trends include public health entrepreneurship, public health innovation, public choice, sustainability, and entrepreneurial orientation, among others.
Conclusion: Our research provides useful insights to all researchers interested in examining entrepreneurship within the public sector or in non-profit organisations.

Keywords: *Public entrepreneurship, Public innovation, Bibliometrics, Public sector, Scientific mapping, Performance, entrepreneur*

1 Introduction

The term "entrepreneurship" is frequently associated with the private sector, and with small and medium sized enterprises, and start-ups (Kearney et al., 2009). However, the public sector also frequently participates in entrepreneurial action, sometimes providing some of the most important services for the economy.

Research into public entrepreneurship has become pivotal to the contemporary analysis of public administration, and is also frequently examined in the fields of political science, management, economics, sociology, and social psychology, among others (Hayter et al., 2018; Shockley et al., 2006). At a minimum, public entrepreneurship involves the production, distribution or innovation of goods/services for the public. This makes it crucial to the lives of billions of people around the world. For example, entrepreneurial initiatives by public entities include the provision of health care services, water services, emergency services, transportation, and recycling/climate initiatives, among others (Carnes et al., 2019; Rastoka et al., 2022). Therefore, this research seeks to examine all published peer reviewed research on public entrepreneurship by analysing the content, thematic clusters, emerging trends, citations, authors, institutions and the links between all of

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them. To achieve this, we conducted a search on the Scopus database and uncovered articles going back to 1988. These studies spanned numerous academic fields including energy, sports, agriculture, economics, political science, arts/humanities, engineering, computer science, and medicine, among others. Following the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021), we sifted through each article and provided exhaustive detail into every stage of our analysis, making it easily reproducible. Then, we used a bibliometric system of analysis to provide results.

Our research is different from prior studies for several reasons. First, it provides a timely contribution to the academic debate on the topic by providing a solid background for discussion. Second, to our knowledge, this is the first study providing a bibliometric evaluation of academic research on public sector entrepreneurship. As such, our scientific mapping, including our analysis of thematic clusters and emerging trends, provide enormous benefit to scholars on the topic. Third, this study exceeds the usual bibliometric analysis by including a research agenda offering practical recommendations for future research. Fourth, we deploy a systematised method to screen and analyse our data, ensuring transparency and reproducibility. Finally, our research is structured in the following way.

The next section includes our theoretical background and research questions. Afterwards, we provide our methodology, results, discussion/conclusion, and directions for future research.

2 Literature review

Academic inquisition into public sector entrepreneurship can be traced back to the work of Schumpeter (1942), but it was Ostrom (1965) who pioneered empirical investigation on the topic by examining water producers in the West Coastal Basin of southern California. Another very important study for the development of public sector entrepreneurship was provided by Wagner (1966). He introduced the idea of individuals in government providing public services to achieve political gain. Since then, academic scholarship on the topic has grown exponentially. Public sector entrepreneurship has become one of the most frequently studied areas of entrepreneurship as globalisation and the need for sustainable economic growth have grown.

Public sector entrepreneurship is also simply referred to as public entrepreneurship (Moon et al., 2020), however there is no universally consistent definition of the nature, roles or motivations of the public entrepreneur. For example, Ostrom (1965) defined the public entrepreneur as an agent that creates public benefits by innovating through public organisations, while others have broadly argued that a public entrepreneur is more concerned with public policy and decision making (Hughes, 1991). Additionally, a public entrepreneur uses public resources to improve productivity and create social value (Osborne et al., 1992; Zampetakis & Moustakis, 2010), they create or improve public organisations (Carnes et al., 2019; Ramamurti, 1986), are involved in generating innovative ideas for public gain (Becker et al., 2019; Roberts, 1992) and are motivated by political gain (Zerbinati & Souitaris, 2005). According to Hayter et al. (2018), public sector entrepreneurship is often characterised by three factors, "actions that are innovative, that transform a status quo social and economic environment, and that are characterized by uncertainty", while Shockley et al. (2006) offered that public entrepreneurship occurs when a "political actor is alert to and acts on potential profit opportunities, thus moving the system in which the actor is embedded toward equilibrium".

Meanwhile, studies utilising scientific mapping techniques have risen in popularity in recent decades due to a number of factors including an increase in academic output and a rise in the number of sophisticated analytical tools. A component of bibliometric analysis, scientific mapping provides a rigorous and objective analysis of existing literature (Ellegaard & Wallin, 2015; Zupic & Čater, 2015), and can be useful for examining research content, trends, performance and for providing a direction for future studies, among others (Donthu et al., 2021; Linnenluecke et al., 2020). In entrepreneurial research, scientific mapping has been used to analyse the ethical aspect of entrepreneurship (Vallaster et al., 2019), the development of social entrepreneurship (Rey-Martí et al., 2016), the evolution of entrepreneurship education (Fellnhofer, 2019), the impact of research on religion and entrepreneurship (Block et al., 2020), an overview of international entrepreneurship (Baier-Fuentes et al., 2018), and the rise of entrepreneurial universities (Forliano et al., 2021), etcetera. Scientific mapping has also been used in most other academic fields including political science, economics/finance, and health/medicine, among others (Castillo-Vergara et al., 2018).

Therefore, inspired by Zupic and Čater (2015) and Ho et al. (2021) we utilised a bibliometric system to answer the following research questions:

RQ1: What are the current and emerging trends in academic research on public sector entrepreneurship?

RQ2: What are the bibliometric variables, citation level and co-citation structure of public sector entrepreneurship?

RQ3: What are the gaps in current research on public sector entrepreneurship?

This study is guided by the bibliometric guideline proposed by Donthu et al. (2021). They provide a structure to make the research system transparent, relevant, reproducible and generalisable. Furthermore, we also loosely followed the reporting principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIS-

MA) (Page et al., 2021) – we could not follow 100% of the recommendations as our research is not a systematic review or meta-analysis. The materials for our research were retrieved from the Scopus database on the 16th of June 2022. We decided on Scopus because it offers an extensive and reliable scientific content, and is one of the most widely used sources for conducting bibliometric analyses, meta-analyses and systematic reviews (Linnenluecke et al., 2020; Moher et al., 2015). Other sources include the Web of Sciences, EBSCO and Google Scholar, among others. However, while the Web of Sciences and Scopus are the most reputable indexing agencies in academia, Scopus is often the most recommended for research of this nature and is more inclusive (Baas et al., 2020). Moreover, 99% of all articles indexed in the Web of Sciences database are present in Scopus, while only 34% of articles in Scopus are present in the Web of Sciences (Singh et al., 2021). Accordingly, we conducted multiple stages of screenings using the automatic screening tools on the Scopus database, and by carrying out a comprehensive manual investigation of the abstract, title and keywords of all the articles involved in this study. We provide exhaustive information into every step of our analysis.

3 Methods

Figure 1 shows the workflow we used for our screening process. We used the following keywords to search the Scopus database on the 16th of June 2022: public entrepreneurship and public sector entrepreneurship. However, in order to be as expansive as possible, and to include research streams in emerging countries, an updated search was conducted on the 30th of August 2022 to include the following additional keywords: municipal entrepreneurship, local government entrepreneurship and state entrepreneurship. Our search was filtered to include titles, abstracts and keywords. We conducted at least two dozen trial searches using a combination of words before settling on the aforementioned keywords. The first stage of our search produced 2877 documents. Our data analysis was split into 2 main parts, each involving several stages of screening. The first part involved using the automated tools on Scopus to exclude irrelevant articles. The second part involved a painstaking manual evaluation of all included articles.

For the first part, we decided to excluded all non-journal articles due to variations in the peer review process of conference proceedings, books series and other types of publications. As a result, our first screening was to exclude all books, conference papers, book chapters, editorials, reviews, notes and erratum. This excluded 903 documents (n = 903) and included 1974 relevant documents (Figure 1). Our next screening limited the source of all the articles to only those from journals, leading to the elimination of sources like trade journals, book series. This further eliminated 28 articles (n = 28), leaving 1946 articles. Furthermore, since it is difficult to conduct a thorough manual analysis of articles written in foreign languages, we further selected only articles published in English language (n = 1865) and excluded languages including Spanish, German, Portuguese, Russian, Chinese, Swedish, Ukrainian, and Lithuanian, among others (n = 81). Then we removed 3 duplicate articles (n = 3), and included 1862 articles. All 1862 articles were included in the second part of our analysis.

For the second part, we thoroughly examined the titles, abstracts and keywords of all included articles, and

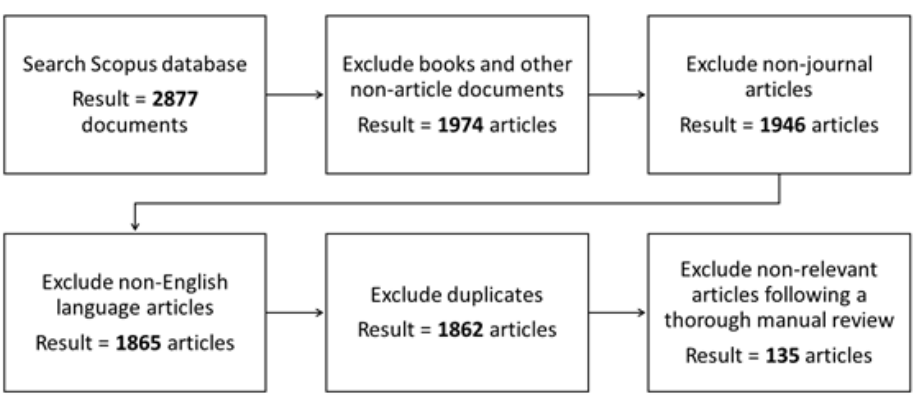


Figure 1: Data selection process. Source: Author's elaboration

in doubtful cases, the full papers were examined. To be included in our analysis, articles must be specifically focussed on assessing entrepreneurship within the public sector and it must be clearly mentioned in the methodology and research objectives of the article. As a result, studies involving public funding agencies such as the Small Business Innovation Research (SBIR) that were primarily focussed on the performance of private firms were excluded. And studies completely focussed on New Public Management (NPM) without assessing entrepreneurship were also excluded. Also, articles on social entrepreneurship, technology transfer, and academic entrepreneurship which were not specific to the public sector were also excluded. Finally, articles on public innovation, which did not specifically examine entrepreneurship were also excluded. Following a meticulous scrutinization of all 1862 articles, we uncovered 11 articles with limited or incomplete information (n = 11) and 1716 articles which were either not on public entrepreneurship at all, or did not meet our inclusion criteria (n = 1716). Therefore, 135 articles were selected for the analytical part of our research (Figure 1), which was conducted using the VOSviewer software (v.1.6.18) (van Eck & Waltman, 2010) and Microsoft Excel (v. 2019).

4 Results

4.1 Citation analysis

The goal of citation analysis is to analyse the most influential studies in a research area (Donthu et al., 2021). To achieve this, we limited our analysis to only studies with at least 50 citations (n ≥ 50). This produced 14 articles (n =14).

Our results (Figure 2) show that the most influential study on public sector entrepreneurship is the study by Klein et al. (2010) attempting to theorise the field. Next is Bartlett and Dibben's research examining public sector entrepreneurship within 12 local governments (Bartlett & Dibben, 2002). This was closely followed by another study of Klein et al. (2013) examining strategic entrepreneurship

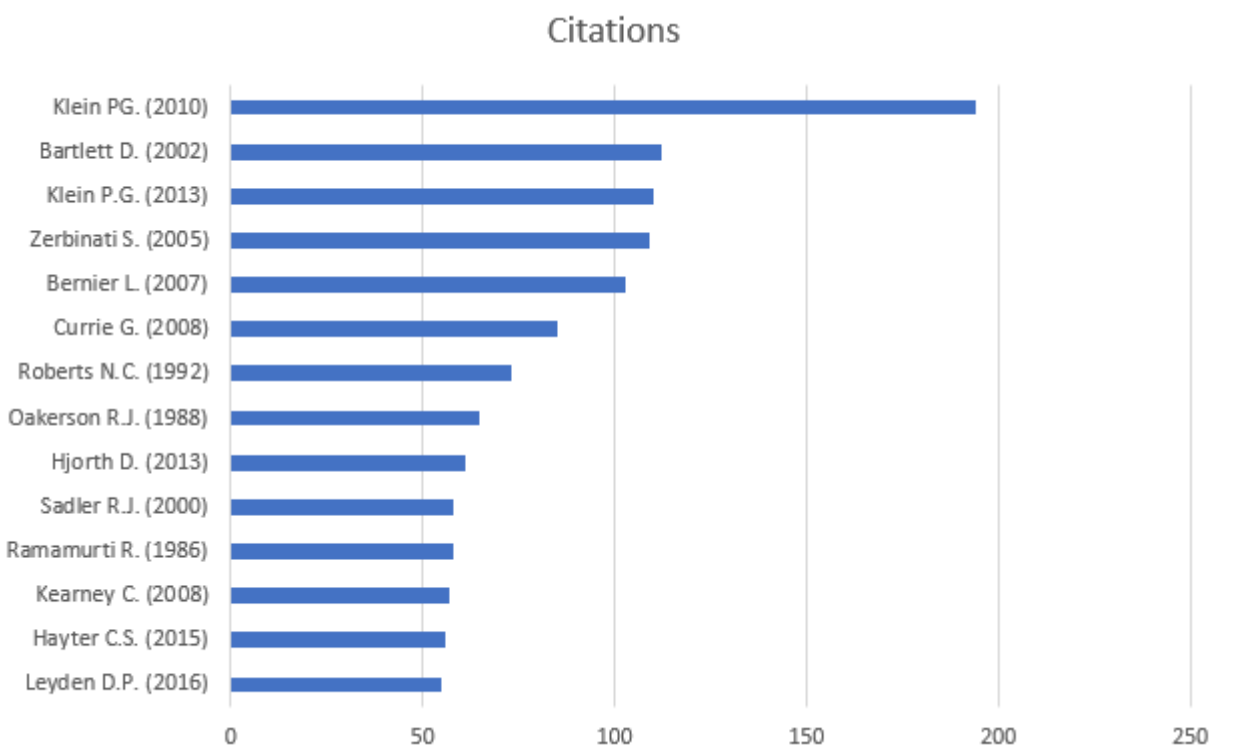


Figure 2: Most influential studies. Source: Author's work

in public sector organisations, and one by Zerbinati and Souitaris (2005) providing a framework for analysing public entrepreneurship in European local governments.

4.2 Co-citation

Co-citation analysis is one of the most notable methods for mapping a scientific field. It analyses the references of published articles to find thematic clusters and similarities based on the number of times they are cited together (Castillo-Vergara et al., 2018; Donthu et al., 2021; Sweileh et al., 2017). To achieve optimal results, we limited our scope to articles with a minimum number of 4 citations to a cited reference ($n \geq 4$). 49 articles met this limit.

Figure 3 shows the most frequent co-cited references in public entrepreneurship. The co-citations are grouped into various clusters, visible by their colour in figure 3. The first (red cluster) is led by the works of Sadler (2000) and Ramamurti (1986) which both examined the similarities and differences between private sector entrepreneurs and public sector ones. The second cluster show strong co-ci-

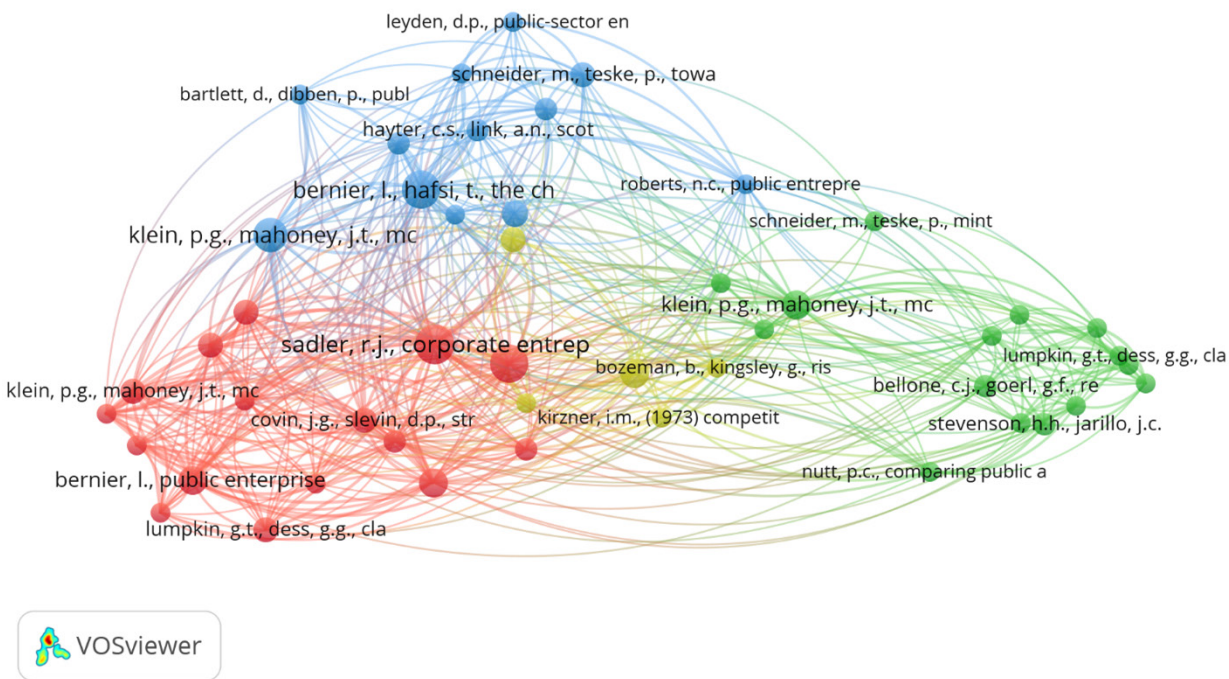


Figure 3: Co-citation. Source: Author's work using VOSviewer

tation links between the study by Bernier and Hafsi (2007), titled: The changing nature of public entrepreneurship, and other studies by Shane Klein (2008), Zerbinati and Souitaris (2005), Hayter et al. (2018).

4.3 Bibliographic coupling

Bibliographic coupling is also an analysis of citation (Zupic & Čater, 2015). However, unlike co-citation, bibliographic coupling presupposes that publications are similar in content if they share similar references/citations (Kessler, 1963; Martyn, 1964; Zupic & Čater, 2015). For this analysis, we limited our scope to articles with a minimum number of 10 citations ($n \geq 10$). 60 articles met this threshold.

Figure 4 shows the bibliographic coupling of references in public entrepreneurship. The articles with the closest similarity are those by Klein et al. (2010), Leyden (2016), and Ford and Anderson (2019), all in the red cluster. Also, in the red cluster, there are very similar links between Klein et al. (2013), and Cunningham et al. (2016). In the blue cluster, there are close similarities on articles examining public entrepreneurship at the macro/state level. They include studies by Etzkowitz and Gulbrandsen (1999),

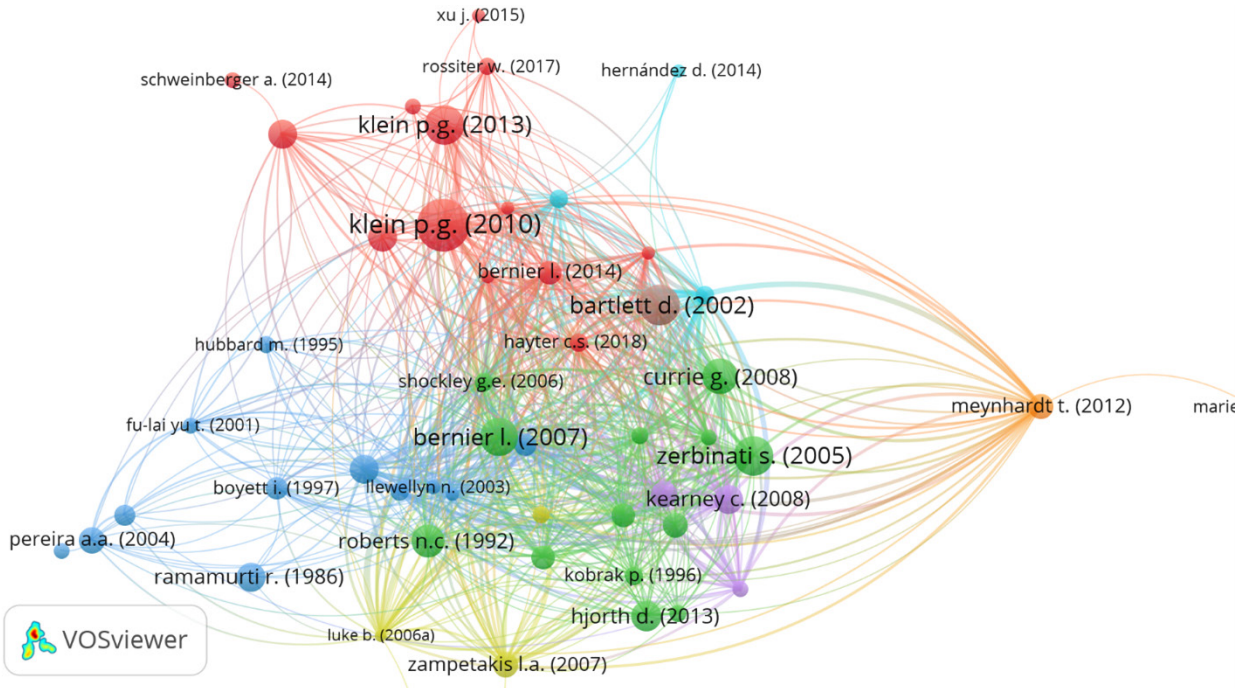


Figure 4: Bibliographic coupling. Source: Author's work using VOSviewer

Pereira (2007), and Sun (2015). Furthermore, in the green cluster, a number of conceptual studies on public entrepreneurship share close similarity links. They include articles by Edwards et al. (2002) on the rhetoric and context of public entrepreneurship, and another by Hjorth (2013) on creating social change with public entrepreneurship.

4.4 Co-word analysis

Co-occurrence analysis analyses the keywords of published articles to find similarities between them. It is excellent for visualising the development of a research field, and for analysing emerging trends and methods (Goyal & Howlett, 2018; Linnenluecke et al., 2020; Nederhof & Wijk, 2006). Therefore, to analyse the most co-occurring words, we limited our analysis to keywords co-occurring at least 2 times ($n \geq 2$). Of the 499 total keywords, only 94 met this threshold ($n = 94$), then we excluded the keywords article and humans.

Figure 5 shows the co-occurrence analysis of academic publications on public sector entrepreneurship. It shows that the most frequent co-occurring keywords include innovation, entrepreneurship, public sector, public entrepreneurship, governance, institutions, public organisations, reinventing government, technology, health services, local government, and public administration, among others (figure 5).

Overlay analysis is used to provide a visual analysis of the trend for a research area (van Eck & Waltman, 2010). In this case, it shows the trend over time of co-occurring keywords. In Figure 6, the overlay analysis is used to provide a visual analysis of the emerging trends in public sector entrepreneurship. Some emerging keyword trends include public health entrepreneurship, public health innovation, public choice, organisational performance, sustainability, state-owned enterprises, and entrepreneurial orientation, among others (figure 6).

4.5 Co-authorship

Co-authorship is used to analyse the level of collaboration between authors, countries, or institutions in a research area (Donthu et al., 2021). We chose to analyse the intellectual collaboration between countries. Only countries with at least 2 published articles were included ($n \geq 2$). This yielded 24 documents ($n = 24$). No citation limits were included in the analysis.

Figure 7 shows that the most dominant countries are the United States and the United Kingdom. Germany, New Zealand, Singapore, Ireland, Canada and Italy are also prominent. It (Figure 7) shows that the strongest collaboration link is between China, Hong Kong, Singapore and

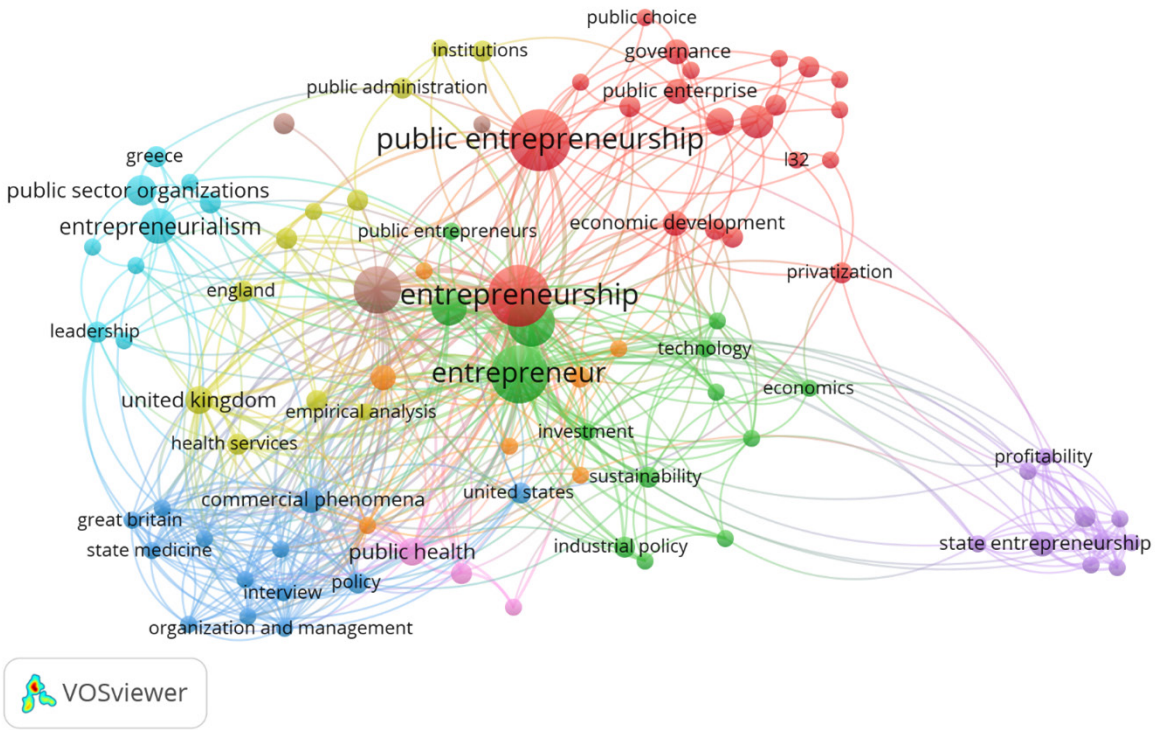


Figure 5: Co-word analysis. Source: Author's work using VOSviewer

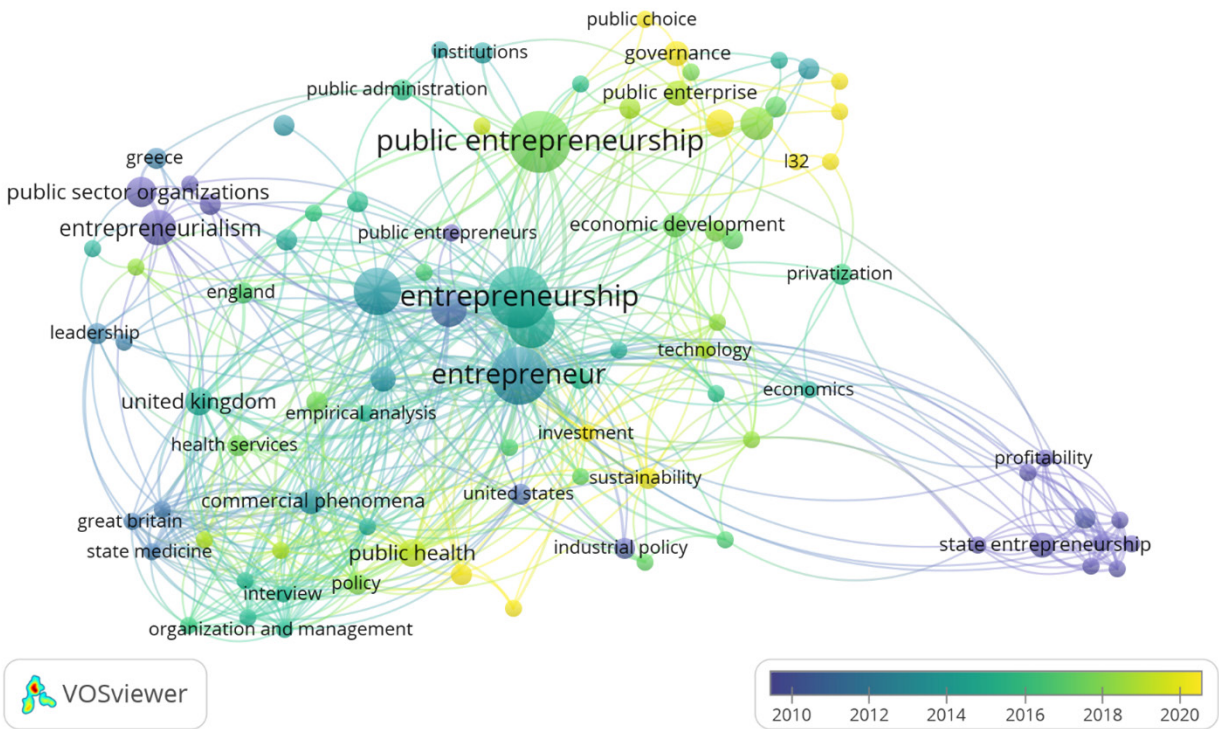


Figure 6: Overlay analysis of co-word. Source: Author's work using VOSviewer

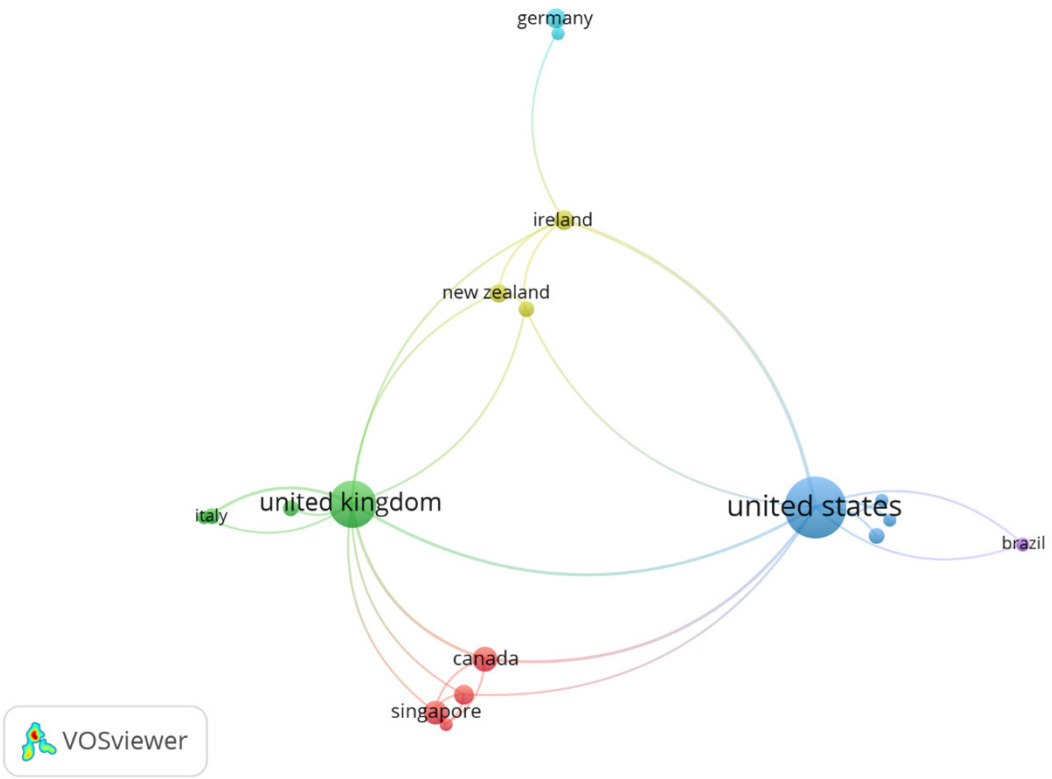


Figure 7: Country co-authorship. Source: Author's work using VOSviewer

Canada (red cluster). Strong collaboration links also exists between the United States, Norway, South Korea and Greece (blue cluster), and between Germany and Switzerland (light blue cluster).

5 Discussion and research agenda

This research presents a comprehensive analysis of peer reviewed academic publications on public sector entrepreneurship from 1982-2022 using a scientific mapping approach. First we examined the most impactful studies in public entrepreneurship research, revealing that studies by Klein et al. (2010), Bartlett and Dibben (2002) and Klein et al. (2013) are the most impactful when measured by their citations (Figure 2). We also examined the co-citation structure (Figure 3) and bibliographic coupling (Figure 4). The bibliometric coupling revealed similarities between the following studies: Klein et al. (2010), Leyden (2016), and Ford and Anderson (2019) (Figure 4). Furthermore, results following our co-word analysis show that the dominant themes in public entrepreneurship include innovation, reinventing government, entrepreneurship, public sector, public entrepreneurship, public organisations, health services, local government, and public administration, among others (Figure 5), while emerging trends include public health entrepreneurship, public health innovation, sustainability, state-owned enterprises, and entrepreneurial orientation, among others (Figure 6).

While academic attention on public sector entrepreneurship has increased, we uncovered a number of important gaps and limitations during our research. The most striking one is that there are few empirical studies on public sector entrepreneurs. A majority of the studies we examined were either conceptual or theoretical, and in some cases involve specific case-studies. This confirms the findings of previous studies (Mohammed et al., 2021). Therefore, we provide detailed research suggestions below.

Methodological gaps and suggestions

A striking challenge in the field of public sector entrepreneurship is the lack of publicly available databases on the subject. This is unlike in private entrepreneurship where databases like the Global Entrepreneurship Monitor (GEM) and the Comparative Entrepreneurship Data for

International Analysis (COMPENDIA) based on OECD statistics provide a vital resource for scholars. Instead, a majority of the examined studies either provided conceptual/theoretical analysis of public sector entrepreneurship or analysed the phenomenon within a public sector unit such as in public university, a local government/council, or in a public institution, mostly based on the small cross-sectional investigations of the researchers. This has posed a number of challenges for the field. First, there are very limited longitudinal studies on public sector entrepreneurship. Scholars have long argued that entrepreneurship is a process which is better captured by examining it over a long period of time (Keupp & Gassmann, 2009; Langley, 2009). Moreover, studies, albeit on private entrepreneurship, have shown the existence of a five year time lag between starting entrepreneurial action and reaping the rewards of entrepreneurship (Fritsch & Mueller, 2004). All of these indicate the necessity for longitudinal studies to accurately analyse entrepreneurship in the public sector. Therefore, this article recommends that future studies not only examine the topic in the short term, but in the long term as well.

In a similar vein, the lack of any database, much less a synchronised/harmonised one, has meant a lack of cohesion in measuring the performance of public sector entrepreneurs. As a result, the field suffers from a lack of sufficient comparative studies. For example, while there are studies on public-private collaborations engagements and differences (Buitelaar et al., 2022; Carbonara & Pellegrino, 2020; Hayter, 2015), there are almost no studies on cross-border comparisons of public sector entrepreneurs, and there are very limited comparative studies between public sector institutions. As such, this paper recommends that future studies consider this direction. The author also recommends that policy makers and/or private institutions establish local and international databases to capture the performance of public sector entrepreneurs.

Research focus gaps and suggestions

The literature on public sector entrepreneurship shows a very diverse focus. Scholars in the field have examined the topic in macro/federal level (Etzkowitz & Gulbrandsen, 1999; Sun, 2015), at the meso/regional or local level (Rodrigues & Franco, 2021), and in public institutions and agencies (Meynhardt & Diefenbach, 2012; Rivera & Landahl, 2019). We also found studies on the public health sector (Jacobson et al., 2015), public water systems (Marie, 2016), and public schools (Yemini et al., 2015), among others. There is also a wide range of concepts such as ethics (Eimicke et al., 2000), innovative behaviour (Zampetakis & Moustakis, 2007), and economic performance (Rossiter & Smith, 2017), among others, most of which are shown in Figures 5 and 6. However, there are some major limitations. First, there are very few studies exploring the impact of public sector entrepreneurship on environmental sustainability and climate change, even though there is a major focus on the topic in most other fields/sub-fields of entrepreneurship. While sustainability is an emerging topic (figure 6), only few studies have attempted to connect the activities of public entrepreneurs with sustainable development. Furthermore, studies on the impact of gender and diversity are also limited, despite the intense efforts to diversify the public services in countries such as the United States, the United Kingdom and New Zealand (Brannan, 2021; Lomas, 2021; Parker et al., 2022). Therefore, this paper advocates a focus on these issues in the future, as well on the social impact of public sector entrepreneurial action.

Conversely, unlike in private entrepreneurship, there are limited studies on the influence of social, cultural and environmental factors on the public sector entrepreneur. In fact, there are very limited studies on the entrepreneurial journeys of public sector institutional or individual entrepreneurs. While there are studies on the behaviour of public entrepreneurs (Zampetakis & Moustakis, 2007) and their entrepreneurial orientation (Urban, 2021), their journey towards entrepreneurial action has not been sufficiently explored. Wiklund et al. (2011) argued that understanding the journeys that shape entrepreneurial action is crucial for understanding entrepreneurship. Similarly, the influence of political party ideology on the entrepreneurial orientation of public employees has not been sufficiently studied. For example, are public institutions more likely to engage in entrepreneurship during a Labour or Conservative government in the United Kingdom, or under a Democratic or Republican administration in the United States? And in other parts of the world. Moreover, the efficiencies and benefits of public entrepreneurship under different political parties have also been under-explored. The author suggests a focus on these issues in future studies.

Research scope gaps and suggestions

In addition, the overwhelming majority of studies on public sector entrepreneurship have been focussed on developed countries. This is partly expected due to the concentration of authors on in developed countries (figure 7), and due to other factors such as the absence of data in developing countries, and the better performance of academic institutions in developed countries (Merigó & Yang, 2017). Nevertheless, there is an enormous gap in academic research on public sector entrepreneurship in developing countries. While there are few studies on China and Singapore, studies covering other countries in Asia, the African continent and Latin America are significantly

underrepresented. Authorship collaborations with scholars in these countries are also very limited (figure 7). The large population of these countries, as well as the growing importance of their economies to the global system mean that studies on them would provide significant benefits to the academic debate on public sector entrepreneurship.

6 Conclusion and limitation

We sought to scientifically map the field of public sector entrepreneurship. We investigated the thematic clusters in the field and identified the current and emerging trends. Crucially, we also uncovered research gaps and provided directions for future research. Our study is limited by the following factors: First, we only used data from the Scopus scientific database. Second, our scope was limited to only peer reviewed journal articles. Therefore, other contributions such as books, book chapters, conference proceedings and editorials were excluded.

Acknowledgement

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Data availability

Research materials are accessible at the Open Science Framework: https://osf.io/3tjvp/?view_only=de4033024dac46b29b4dffe1992c404c

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