

Healthcare entrepreneurship: current trends and future directions

Healthcare
entrepreneurship

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Abstract

Purpose – The goal of this article is to provide an overview of healthcare entrepreneurship, both in terms of its current trends and future directions.

Design/methodology/approach – The article engages in a systematic review of extant research on healthcare entrepreneurship using the scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR) as the review protocol and bibliometrics or scientometrics analysis as the review method.

Findings – Healthcare entrepreneurship research has fared reasonably well in terms of publication productivity and impact, with diverse contributions coming from authors, institutions and countries, as well as a range of monetary and non-monetary support from funders and journals. The (eight) major themes of healthcare entrepreneurship research revolve around innovation and leadership, disruption and technology, entrepreneurship models, education and empowerment, systems and services, orientations and opportunities, choices and freedom and policy and impact.

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Research limitations/implications – The article establishes healthcare entrepreneurship as a promising field of academic research and professional practice that leverages the power of entrepreneurship to advance the state of healthcare.

Originality/value – The article offers a seminal state of the art of healthcare entrepreneurship research.

Keywords Entrepreneurship, Healthcare, Bibliometrics, Scientometrics, Systematic review

Paper type Literature review

1. Introduction

Healthcare is fundamental to enriching (i.e. improving health outcomes), safeguarding (i.e. preventing disease and illness) and supporting (i.e. monitoring and maintaining good health and wellbeing) public health. As a unifying lynchpin, healthcare entails both health (e.g. diagnostic and treatment) and care (e.g. palliative care, rehabilitation and recovery and social care) services.

The history of healthcare could be traced back to ancient Greece where (public) hospitals were first established by the Byzantine Empire in the 4th century (Riva and Cesana, 2013). The rise of modern-day healthcare could be located in the 19th century following the emergence of innovative entrepreneurs in healthcare such as Florence Nightingale who in 1860 established the first nursing school in the world (Karimi and Alavi, 2015). Fast forward to the 21st century, healthcare has evolved into a truly diverse state, consisting of both local and international public and private practice that offers a wide range of health and care services in co-created and integrated ways across in-person and virtual modes involving the latest innovation and technologies as well as social practices (e.g. citizen science and telehealth) (Ciasullo *et al.*, 2022a, b; Lim, 2016, 2021; Lim and Ting, 2012; Mishra and Pandey, 2023; Sahoo *et al.*, 2023; Yap *et al.*, 2023).

The evolution and proliferation of healthcare would, inarguably, not have reach its present state without entrepreneurship, which is widely regarded as a catalyst of innovation (Maritz *et al.*, 2020) and a magnifier of impact (Rastoka *et al.*, 2022). At its core, *entrepreneurship* can be defined as the dynamic, innovative, strategic, resourceful and resilient process of starting, managing and growing a venture that generates profit. When these profits are channeled back into the venture to effectuate positive change and scale activities that benefit society, the venture evolves into *social entrepreneurship* – a form of entrepreneurship that typically blends financial goals with the desire to create positive societal outcomes. Nevertheless, it is important to note that while reinvesting profits for positive change is a distinguishing feature of many social entrepreneurial ventures, the crux lies in the purpose-driven intent and outcome of creating societal impact. Unlike traditional entrepreneurs who measure performance in terms of the *return on investment* (profit), social entrepreneurs prioritize the *return on value* (societal benefits), often employing a combination of both profit-oriented and non-profit strategies to achieve their objectives. Such delineations of entrepreneurship and social entrepreneurship align with recent scholarly investigations (e.g. Sharma *et al.*, 2023; Snihur *et al.*, 2022; Tan Luc *et al.*, 2022; Vedula *et al.*, 2022). Given that profit-making ventures that inherently serve a social purpose and generate social impact may be regarded as social entrepreneurship, we define *healthcare entrepreneurship* as a form of social entrepreneurship centered on advancing healthcare delivery, products, or services that inherently generate social good.

Several reviews on advances in healthcare have been conducted. For example, Ciasullo *et al.* (2022a) delivered an overview of citizen science in healthcare, whereas Ciasullo *et al.* (2022b) offered a retrospection of the patient as a prosumer of healthcare while Sahoo *et al.* (2023) presented the state of telehealth research. In the domain where healthcare and entrepreneurship intersect, existing reviews tend to engage in a narrow rather than a broad examination. For example, Suryvanshi *et al.* (2020) carried out a scoping review of

entrepreneurship in health sciences education, [Chahine \(2021\)](#), conducted a scoping review of on public health entrepreneurship and intrapreneurship, [Callegari and Feder \(2022\)](#) engaged in a framework review of complex interactions between entrepreneurship and epidemics, [Khalid et al. \(2022\)](#) offered a systematic review of social enterprises that implemented gender-responsive health-related programs, [Mishra and Pandey \(2023\)](#) performed a systematic review of global entrepreneurship in healthcare and [Sreenivasan and Suresh \(2023\)](#) presented a systematic review of healthcare startups in the era of digitalization. Notwithstanding the finer-grained insights that have been contributed by these reviews, they remain *limited* in providing a holistic overview of healthcare entrepreneurship, which is the broad, overarching, or umbrella field of research where these specific domains reside. Gaining this understanding is *necessary* to accurately ascertain the progress of current research and *important* to chart the trajectory of future research in an informed manner. Pursuing a review of healthcare entrepreneurship is also *relevant* as the healthcare industry has the potential to act as a fertile ground for entrepreneurship, and by extension, it is the advancement of healthcare in return ([Garbuio and Lin, 2018, 2019](#)). Such a review is also *urgent* given the recent experience of COVID-19, which has not only revealed extant gaps in healthcare but also the importance of entrepreneurship as the unsung hero ([Maritz et al., 2020](#)) in overcoming the challenges in the delivery of healthcare ([Apostolopoulos et al., 2022](#)).

Building on the groundwork of previous studies ([Callegari and Feder, 2022](#); [Chahine, 2021](#); [Ciasullo et al., 2022a, b](#); [Khalid et al., 2022](#); [Mishra and Pandey, 2023](#); [Sahoo et al., 2023](#); [Sreenivasan and Suresh, 2023](#); [Suryvanshi et al., 2020](#)), the impetus to conduct a comprehensive review of healthcare entrepreneurship is both compelling and warranted. *Theoretically*, there is a distinct gap in the literature; while there are numerous investigations into specific facets of healthcare and entrepreneurship, there is a notable lack of an overarching analysis of the field in its entirety. This deficiency hinders our ability to critically assess and integrate existing knowledge, limiting the advancement of a cohesive theoretical understanding essential for guiding future research and practice ([Garbuio and Lin, 2018, 2019](#)). Furthermore, the field of healthcare entrepreneurship is ripe for theoretical diversification, necessitating the integration of diverse perspectives, to enrich our conceptualizations and frameworks. *Practically*, the healthcare sector presents unparalleled opportunities for entrepreneurial innovation, promising substantial improvements in efficiency, patient outcomes and overall system resilience ([Garbuio and Lin, 2018, 2019](#)). The COVID-19 pandemic has underscored this point, revealing the healthcare system's vulnerabilities and the pivotal role of entrepreneurial initiatives in addressing these challenges and propelling healthcare delivery forward ([Apostolopoulos et al., 2022](#); [Maritz et al., 2020](#)). Moreover, as healthcare continues to evolve in response to technological advancements and changing patient demographics, there is a pressing need for entrepreneurs to contribute to this transformation, ensuring that the healthcare system remains adaptive and sustainable. Therefore, a thorough review of healthcare entrepreneurship is both academically indispensable and practically vital. Such a review promises not only to bridge theoretical gaps and foster multi-perspective dialogs but also to translate scholarly insights into actionable strategies, fortifying the healthcare system against future challenges and facilitating its ongoing evolution.

Given the aforementioned limitation, necessity, importance and urgency in line with [Lim \(2022\)](#) for a comprehensive articulation of the underlying motivation of new research, this article *aims* to provide an overview of healthcare entrepreneurship, both in terms of its current trends and future directions. To do so, this article adopts a systematic literature review (SLR) approach in line with the recommendation of [Kraus et al. \(2022\)](#) and [Lim et al. \(2022\)](#) using the scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR) as the review protocol ([Paul et al., 2021](#)) and bibliometrics or scientometrics analysis as the review method ([Donthu et al., 2021](#); [Mukherjee et al., 2022](#)).

In doing so, this article contributes by evaluating the performance, providing a directory of expertise and mapping extant knowledge of healthcare entrepreneurship research (Kraus *et al.*, 2022; Mukherjee *et al.*, 2022).

The rest of the article is organized as follows. The next sections disclose the review methodology, followed by the review findings, which is organized based on the bibliometrics or scientometrics analysis that is conducted (i.e. performance analysis and science mapping). The article concludes with key takeaways and promising pathways for future healthcare entrepreneurship research.

2. Methodology

This article adopts a SLR approach to provide an overview of healthcare entrepreneurship, both in terms of its current trends and future directions. In essence a SLR engages in a systematic process to review the literature and thus is deemed to be transparent and replicable, unlike traditional literature reviews that do not engage in a systematic process in its review (e.g. critical reviews) (Kraus *et al.*, 2022; Lim *et al.*, 2022). To engage in a systematic process of reviewing the literature, we adopt the SPAR-4-SLR protocol, which consists of three stages (and six sub-stages): assembling (identification and acquisition), arranging (organization and purification) and assessing (evaluation and reporting) (Paul *et al.*, 2021). To analyze the literature derived from this systematic process, a bibliometrics or scientometrics analysis is performed (Donthu *et al.*, 2021) as it can handle a large corpus of articles and enables the reviewing of that corpus in an objective manner due to its reliance on quantitative techniques and statistical information (Mukherjee *et al.*, 2022). The review methodology is depicted in Figure 1 and disclosed in greater depth in the next sections.

2.1 Assembling

To *assemble* the literature on healthcare entrepreneurship, we engage in the activities of identification and acquisition.

In terms of *identification*, we focus on the *domain* of healthcare entrepreneurship and ask the following *research questions* (RQs):

RQ1. How is the performance of healthcare entrepreneurship research?

RQ2. Who are the contributors of healthcare entrepreneurship research?

RQ3. What are the major themes and topics in healthcare entrepreneurship research?

RQ4. Where can healthcare entrepreneurship research be pursued in the future?

Besides that, the identification of healthcare entrepreneurship research also necessitates the selection of source type and source quality. Here, the *source type* selected is journals, as they signify the highest level of peer-review scrutiny (Lim, 2022), whereas the *source quality* selected is Scopus, which not only indexes sources that satisfy a stringent set of quality criteria but also serve a dual role as a search mechanism for the acquisition of articles (Paul *et al.*, 2021).

In terms of *acquisition*, we use Scopus as the *search mechanism* and tool for *material acquisition* in line with the recommendation of Donthu *et al.* (2021) and Paul *et al.* (2021). The *search period* was limited up to 2022, which is the latest full year at the time of review, enabling a more accurate evaluation of yearly performance, which is in line with recent review practice (Singh *et al.*, 2023). The *search keywords* were brainstormed among four professors (two in Asia and two in Europe) who have published on healthcare in the business discipline. These keywords were also cross-checked in two ways, first, against a random selection of 10 articles on healthcare entrepreneurship, and second, with five healthcare entrepreneurs via LinkedIn. These keywords were paired with operators (OR, AND, *) to

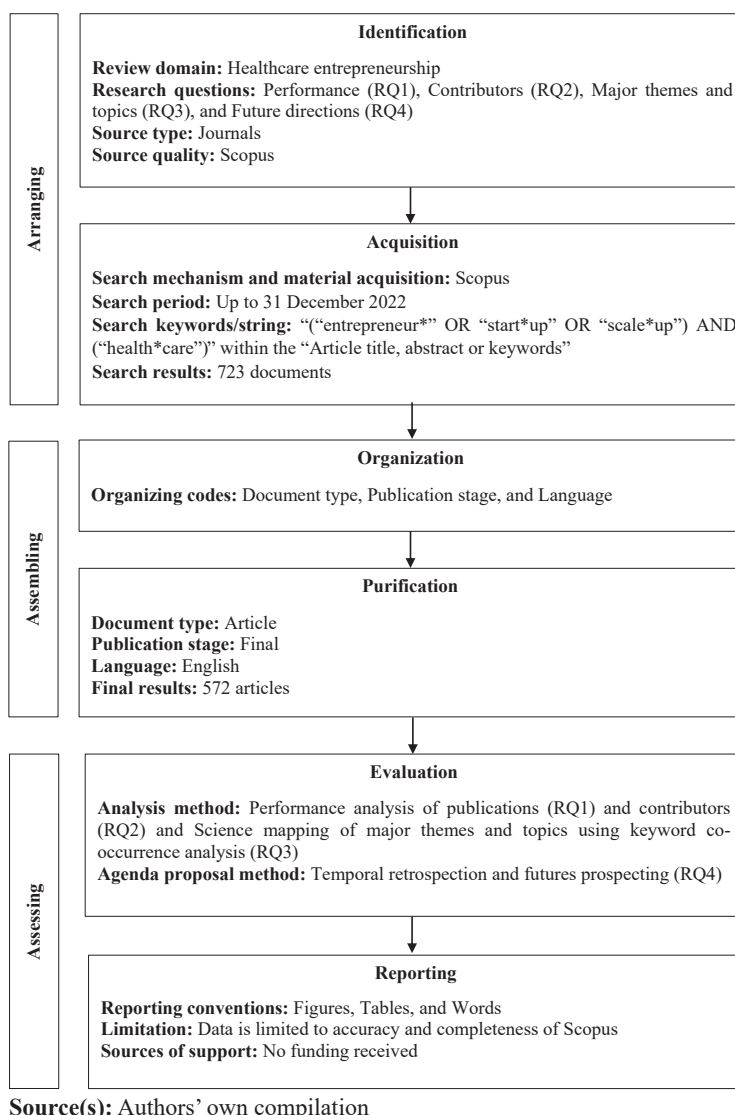


Figure 1.
The methodology for
reviewing healthcare
entrepreneurship
research

form the *search string* “(‘entrepreneur*’ OR ‘start*up’ OR ‘scale*up’) AND (‘health*care’)” that is used for the search within the article title, abstract and keywords in Scopus. This practice is in line with the 3 Es (experience, expertise, exposure) recommendation of [Kraus *et al.* \(2022\)](#). In total, 723 documents were returned form the *search results* in the assembling stage of the review.

2.2 Arranging

To *arrange* the literature on healthcare entrepreneurship returned from the assembling stage, we engage in the activities of organization and purification. We leverage the Scopus

categorization of documents, namely document type, publication stage and language, to *organize* and *purify* the documents. Specifically, we chose articles (i.e. *document type*) that were finalized (i.e. *publication stage*) and published in English (i.e. *language*) on the basis that articles (1) represent the development of new knowledge that have been peer reviewed (e.g. unlike editorials and notes), (2) could be replicated in search and review when finalized and (3) could be understood and reviewed given that English is lingua franca of scientific research. The rationales behind these review decisions are in line with the recommendations of Kraus *et al.* (2022). As a result, a total of 572 articles that fulfilled these criteria were included and 151 articles that did not were excluded in the review.

2.3 Assessing

To *assess* the literature on healthcare entrepreneurship returned from the arranging stage, we engage in the activities of evaluation and reporting.

In terms of *evaluation*, we engage in bibliometrics or scientometrics analysis. In particular, a performance analysis is conducted to ascertain the performance of healthcare entrepreneurship research (RQ1) and identify the contributors of healthcare entrepreneurship research (RQ2), whereas a science mapping using a keyword co-occurrence analysis is performed to unpack the major themes and topics in healthcare entrepreneurship research (RQ3) and locate promising pathways that healthcare entrepreneurship research can pursue in the future (RQ4). These analyses were conducted using the analytics functions in Scopus and VOSviewer (Van Eck and Waltman, 2010). More importantly, the scope of bibliometrics or scientometrics analysis herein is in line with the recommendations of Donthu *et al.* (2021).

In terms of *reporting*, we use the *conventions* of reporting our findings primarily in words with the supplementary support of relevant visuals such as figures depicting network diagrams and tables presenting key statistics. We also *disclose* that we have no conflict of interests that may influence the findings of the review and that we have not received any funding for this review.

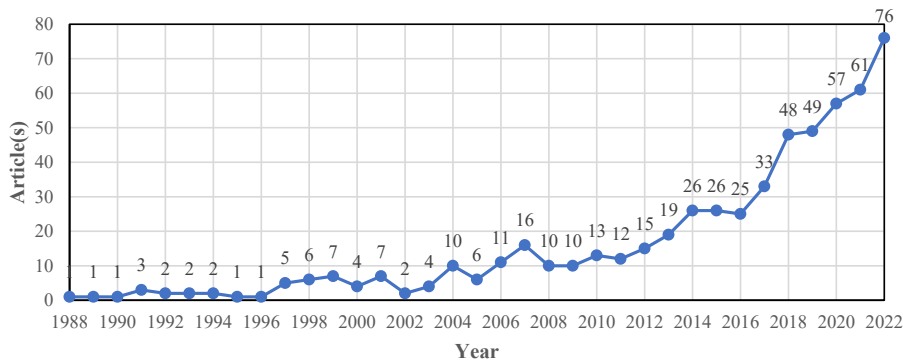
In total, 572 articles were assessed in the present review of healthcare entrepreneurship research and the findings are reported in the next sections.

3. Findings

3.1 Performance of healthcare entrepreneurship research (RQ1)

The publication trend of healthcare entrepreneurship research is depicted in Figure 2. The figure shows that healthcare entrepreneurship research began in 1988, which examines an entrepreneur's venture into women's healthcare (Meadows, 1988). The field's research was sluggish in its initial years, recording publications of only a single digit each year, and it is not until five years into the new millennium that the field begun to publish research in double digits, with exponential growth witnessed in the last five years (2018–2022) and 2022 setting the record for the highest number of publications, which may be attributed to increasing emphasis on innovation (Sharma *et al.*, 2022a) and interest in entrepreneurship education (Martina and Göksen, 2022), as well as the rise of entrepreneurial opportunities and threats emerging from COVID-19 (Sharma *et al.*, 2022b), new-age technologies (Shepherd and Majchrzak, 2022) and sustainability challenges (Ketprapakorn and Kantabutra, 2022).

The impact of publications on healthcare entrepreneurship research is presented in Table 1. The table shows that the most impactful article is by Camarillo *et al.* (2004), who emphasize the importance of a shared understanding among surgeons, engineers, entrepreneurs and healthcare administrators to build on past success and fully leverage the potential of surgical robotics in the future. This is followed by Meterko *et al.* (2004), who



Source(s): Authors' own compilation

Figure 2.
Publication trend of
healthcare
entrepreneurship
research

Rank	Author(s) and year	Article	Journal	Citations
1	Camarillo et al. (2004)	Robotic technology in surgery: past, present, and future	American journal of surgery	358
2	Meterko et al. (2004)	Teamwork culture and patient satisfaction in hospitals	Medical care	204
3	Kuratko et al. (2001)	Improving firm performance through entrepreneurial actions: Acordia's corporate entrepreneurship strategy	Academy of management executive	202
4	Acs et al. (2016)	Public policy to promote entrepreneurship: a call to arms	Small business economics	196
5	Gupta et al. (2020)	Security and privacy in smart farming: challenges and opportunities	IEEE access	172
6	Srivastava and Shainesh (2015)	Bridging the service divide through digitally enabled service innovations: evidence from Indian healthcare service providers	MIS quarterly: management information systems	160
7	Ateljevic (2020)	Transforming the (tourism) world for good and (re)generating the potential "new normal"	Tourism geographies	128
8	Monsen and Wayne Boss (2009)	The impact of strategic entrepreneurship inside the organization: examining job stress and employee retention	Entrepreneurship theory and practice	124
9	Dimitrov (2019)	Blockchain applications for healthcare data management	Healthcare informatics research	98
10	Angst et al. (2017)	When do it security investments matter? Accounting for the influence of institutional factors in the context of healthcare data breaches	MIS quarterly: management information systems	84

Source(s): Authors' own compilation

Table 1.
Most impactful articles
on healthcare
entrepreneurship

highlight the importance of entrepreneurial cultures and mindsets in healthcare teams to satisfy patients and [Kuratko et al. \(2001\)](#), who showcase the power of entrepreneurial actions in improving firm performance. The rest in the list of the top 10 most impact articles on healthcare entrepreneurship relate to digitalization ([Angst et al., 2017](#); [Dimitrov, 2019](#);

Srivastava and Shainesh, 2015), public policy (Acs *et al.*, 2016), strategic management (Monsen and Wayne Boss, 2009), as well as lessons and implications that extrapolate to new fields of research (Ateljevic, 2020; Gupta *et al.*, 2020).

The distribution of journals where these impactful articles on healthcare entrepreneurship are published provides an intriguing insight into the multifaceted nature of the subject. Notably, only one article, by Monsen and Wayne Boss (2009), appeared in a dedicated entrepreneurship journal, *Entrepreneurship Theory and Practice*. This pattern suggests that healthcare entrepreneurship merges a plethora of disciplines, ranging from medicine (Camarillo *et al.*, 2004; Meterko *et al.*, 2004) to economics (Acs *et al.*, 2016), management (Kuratko *et al.*, 2001), information systems (Angst *et al.*, 2017; Srivastava and Shainesh, 2015), information technology (Dimitrov, 2019) and tourism (Ateljevic, 2020). Several motivations could be driving this publishing trend. Firstly, healthcare entrepreneurship often entails the application of entrepreneurial principles in specific clinical or medical contexts, making journals like *American Journal of Surgery* (Camarillo *et al.*, 2004) or *Medical Care* (Meterko *et al.*, 2004) inclined to publish such research. Secondly, the implications of technological trends for healthcare entrepreneurship in the digital era, such as the emphasis on digitalization (Srivastava and Shainesh, 2015) and cybersecurity (Angst *et al.*, 2017; Dimitrov, 2019), might resonate with an information technology (IT)-focused audience, explaining the prominence of articles in journals such as *IEEE Access* and *Healthcare Informatics Research*. However, as the domain matures, there is potential for entrepreneurship journals like *Entrepreneurship Theory and Practice* and the *International Journal of Entrepreneurial Behavior and Research* to take on a more substantial role in shaping the interdisciplinary discourse on healthcare entrepreneurship from the perspective of entrepreneurship. Initiatives such as journal sub-sections and special issues can offer valuable platforms for this purpose.

3.2 Contributors to healthcare entrepreneurship research (RQ2)

The major contributors to healthcare entrepreneurship research are listed in Table 2 according to journals (Panel A), authors (Panel B), institutions (Panel C), countries (Panel D) and funders (Panel E).

In terms of *journals*, *Modern Healthcare* emerges as the most prolific journal with 20 articles, followed by *Journal of Health Organization and Management* and *Technological Forecasting and Social Change* with 10 articles each, *Emerald Emerging Markets Case Studies* with eight articles, *Social Science and Medicine* with 7 articles and *BMJ Open* and *Healthcare Informatics* with 6 articles each (Panel A). Other notable journals that have published healthcare entrepreneurship research include *International Entrepreneurship and Management Journal* with 4 articles and *Entrepreneurship Education and Pedagogy*, *International Journal of Entrepreneurship and Small Business*, *Small Business Economics* and *Technovation* with 3 articles each. This shows that healthcare entrepreneurship research is accepted across a myriad of domains including but not limited to business, entrepreneurship, healthcare, information technology and innovation.

In terms of *authors*, P. Lehou emerges as the most prolific author with 5 articles, followed by M. Friebe, B. Kirchheimer, F.A. Miller and V. Riddle with 4 articles each, 8 other authors with 3 articles each and 56 other authors with two articles each (Panel B). This shows that many scholars are interested in healthcare entrepreneurship research, but not many, to date, have developed a strong track record in this field of research (e.g. absence of double-digit publications), signaling a specialty niche where emerging scholars may wish to pursue and stake a claim.

In terms of *institutions*, Harvard University emerges as the most prolific institution with 17 articles, followed by University of Montreal with 13 articles, University of Toronto with 10

Rank	Panel A. Journal	Articles	Panel B. Author	Articles	Panel C. Institution	Articles	Panel D. Country	Articles	Panel E. Funder	Articles
1	<i>Modern Healthcare</i>	20	Lehous, P	5	Harvard University	17	United States of America	170	Economic and Social Research Council	9
2	<i>Journal of Health Organization and Management and Technological Forecasting and Social Change</i>	10	Friebe, M., Kirchheimer, B., Miller, F.A., and Riddle, V	4	University of Montreal	13	United Kingdom	63	Canadian Institutes of Health Research	8
3	<i>Emerald Emerging Markets Case Studies</i>	8	Apostolopoulos, S., Fritzsche, H., Grin, J., Hassink, J., Hulsink, W., Marques, C.S., Schiavone, F., and Williams, D.R. (<i>n</i> = 8 authors)	3	University of Toronto	10	India	46	National Institutes of Health	4
4	<i>Social Science and Medicine</i>	7	Abetti, P.A., Agarwal, N., Alam, M.M., Alamelu, R., Apostolopoulos, N., Atun, R., Barrett, H., Beaulieu, M., Birnbaum, D., Boese, A., Brem, A., Breton, M., Chauthan, R., Cohen, N., Daudelin, G., Davidson, S., De Allegri, M., Denis, J.L., Durcan, W.J., Galloro, V., Garnsey, E., Gautier, L., Ginter, P.M., Grey, M., He, A.J., Herzlinger, R.E., Kumar, A., Kuo, Y.C., Li, J.F., Liargovas, P., Lunt, N., Makris, I., McLoughlin, I., Mehta, K., Melder, A., Meterko, M., Monzur-E-Elahi, M., Mukherjee, K., Muth, S., Nanda, S., Ormond, M., Pransky, J., Pérez, P.F., Rivieccio, G., Said, J., Santos, G., Shahrar, S.M., Shinkman, R., Sklias, P., Tivari, P., Toscani, M., Urban, B., Wall, S., Warren, L., Weinstein, A., and York, J.M	2	King's College London	6	Canada	34	Council of Scientific and Industrial Research India, European Commission, European Regional Development Fund, Fonds de Recherche du Québec – Santé, Fundação para a Ciência e a Tecnologia, Seventh Framework Programme, United States Agency for International Development, Wellcome Trust, World Bank Group, and World Health Organization	3

(continued)

Table 2.
Major contributors to
healthcare
entrepreneurship
research

Table 2.

Rank	Panel A. Journal	Articles	Panel B. Author	Articles	Panel C. Institution	Articles	Panel D. Country	Articles	Panel E. Funder	Articles
5	<i>BMJ Open and Healthcare Informatics</i>	6			Erasmus Universiteit Rotterdam, University of California San Diego, University of Pittsburgh, University of Washington, Wageningen University and Research	5	Germany	29	Australian Research Council, Bill and Melinda Gates Foundation, Department for International Development, Deutsche Forschungsgemeinschaft, Fundamental Research Funds for the Central Universities, H2020 Marie Skłodowska-Curie Actions, Health Resources and Services Administration, Indian Institute of Science, International Development Research Center, Israel Science Foundation, Johnson and Johnson, Medical Research Council, National Cancer Institute, National Institute for Health Research, National Natural Science Foundation of China, National Science Foundation, Small Business Innovation Research, Social Sciences and Humanities Research Council of Canada, and U.S. Department of Health and Human Services	2

Note(s): Minimum threshold for inclusion of contributor = 2 article
Source(s): Authors' own compilation

articles, King's College London with 6 articles and 5 other institutions with 5 articles each (Panel C). Other noteworthy institutions include IILM Graduate School of Management and University of the Witwatersrand Johannesburg with 4 articles each and Children's Hospital Boston, Massachusetts General Hospital and VA Boston Healthcare System with 3 articles each. This shows that most healthcare entrepreneurship research are conducted by academic institutions while non-academic institutions remain underrepresented, especially in the Global South, which is virtually non-existent.

In terms of *countries*, the United States of America emerges as the most prolific country with 170 articles, followed by the United Kingdom with 63 articles, India with 46 articles, Canada with 34 articles and Germany with 29 articles (Panel D). Other developed countries such as Australia has 19 articles, Japan has 6 articles and Greece has 4 articles while developing countries such as China has 13 articles, South Africa has 12 articles and Malaysia has 7 articles. This shows that most healthcare entrepreneurship research are concentrated in countries located in the Global North while countries situated in the Global South are represented but remains underexplored.

In terms of *funders*, the Economic and Social Research Council emerges as the most prolific funder with 9 articles, followed by the Canadian Institute of Health Research with 8 articles, the National Institutes of Health with 4 articles, 10 other funders with three articles each and 19 other funders with 2 articles each (Panel E), showing that funding is available for healthcare entrepreneurship research, which, with greater awareness, should motivate further research.

3.3 Major themes and topics in healthcare entrepreneurship research (RQ3)

A co-occurrence analysis of author keywords was conducted to unpack the major themes and topics in healthcare entrepreneurship research. The keywords that authors specify in their published articles typically reflect the essence of such articles (Kumar *et al.*, 2022), and thus, the keywords of articles are often treated as the topics studied in the field (Varma *et al.*, 2022). Through a keyword co-occurrence analysis, keywords (topics) that often appear together form a common cluster that represents a major theme in the field (Donthu *et al.*, 2021). In total, the co-occurrence analysis of keywords with a minimum of five occurrences (i.e. the default setting in VOSviewer) revealed a total of 42 keywords (topics) that are segmented across 8 clusters (themes). The nomological network of major themes and topics in healthcare entrepreneurship research is illustrated in Figure 3 and the details are discussed in the next sections by means of sensemaking (Lim and Kumar, 2024) and summarized in Table 3.

Innovation and leadership. Cluster 1 comprises 7 keywords – i.e. “innovation”, “medical education”, “leadership”, “qualitative research”, “healthcare innovation”, “design thinking” and “technology transfer” – that reflect healthcare entrepreneurship research pertaining to *innovation and leadership*. Studies in cluster emphasize the importance of developing entrepreneurial skills and innovation (Panther *et al.*, 2019; Sharma *et al.*, 2022a), which could be done through design thinking (Niccum *et al.*, 2017). They also highlight the returns of entrepreneurial leadership in fostering innovation behavior among medical personnel such as nurses (Bagheri and Akbari, 2018), as well as the that relating to innovation spin-offs such as technology transfer (Helm *et al.*, 2010).

Disruption and technology. Cluster 2 consists of 7 keywords – i.e. “covid-19”, “startup”, “digital health”, “technology”, “blockchain”, “pandemic” and “healthcare entrepreneurship” – that reflects healthcare entrepreneurship research relating to *disruption and technology*. Studies in this cluster shed light on the unprecedented disruption caused by COVID-19 and the ways in which technology is harnessed for digital health in the fight against the pandemic as well as the related infodemic (Lemaire *et al.*, 2022). Other studies devoted attention to new-age technologies such as blockchain and the Internet of things, showing how such

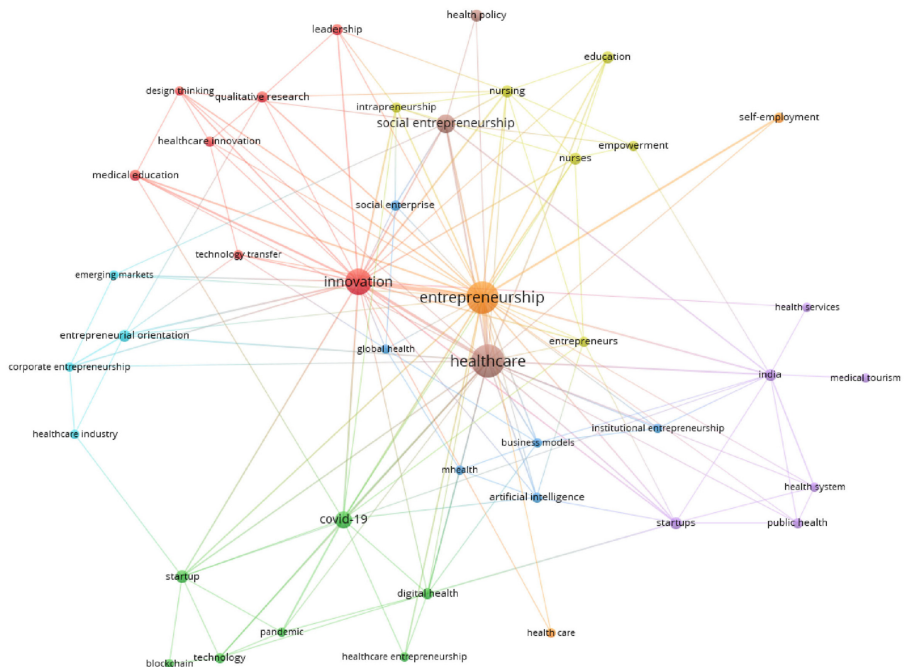


Figure 3.
Nomological network
of major themes and
topics in healthcare
entrepreneurship
research

Note(s): Cluster 1 (Red): Innovation and leadership. Cluster 2 (Green): Disruption and technology. Cluster 3 (Blue): Entrepreneurship models. Cluster 4 (Yellow): Education and empowerment. Cluster 5 (Purple): Systems and services. Cluster 6 (Aqua): Orientations and opportunities. Cluster 7 (Orange): Choices and freedom. Cluster 8 (Brown): Policy and impact

Source(s): Authors' own compilation

technologies could facilitate safe and secure data sharing of personal health records in emergency conditions (Rajput *et al.*, 2021) in addition to identifying business opportunities and enhancing value creation (Tuan *et al.*, 2019).

Entrepreneurship models. Cluster 3 contains 6 keywords – i.e. “artificial intelligence”, “social enterprise”, “mHealth”, “institutional entrepreneurship”, “business models” and “global health” – that reflect healthcare entrepreneurship research pertaining to *entrepreneurship models*. Scholars in this cluster explain that new-age technologies such as artificial intelligence can present opportunities and threats that need to be considered in healthcare entrepreneurship (Shepherd and Majchrzak, 2022). Their studies also looked into the current landscape of lean healthcare startups, showing how venturing into mHealth can foster good customer engagement (Eppley *et al.*, 2021), as well as various models of healthcare entrepreneurship involving the bottom of the pyramid (Angeli *et al.*, 2018), institutional entrepreneurship (Heinze and Weber, 2016), telemedicine (Sundin *et al.*, 2016) and the telepresence of robots (Wang *et al.*, 2021).

Education and empowerment. Cluster 4 covers 6 keywords – i.e. “education”, “nurses”, “nursing”, “empowerment”, “entrepreneurs” and “intrapreneurship” – that reflect healthcare entrepreneurship research relating to *education and empowerment*. Scholars in this cluster reaffirmed the importance of creating a culture of innovation in healthcare (e.g. nursing),

Keyword	Occurrences	Average citations	Average publication year
<i>Cluster 1: innovation and leadership (7 keywords)</i>			
Innovation	39	8.0769	2017.1
Medical education	7	5	2018.7
Leadership	7	4.5714	2019.1
Qualitative research	7	2.2857	2019.6
Healthcare innovation	6	2.6667	2019.8
Design thinking	5	10.6	2019.8
Technology transfer	5	9.4	2014.0
<i>Cluster 2: disruption and technology (7 keywords)</i>			
Covid-19	17	11.4118	2021.5
Startup	10	6	2020.5
Digital health	7	6.5714	2019.6
Technology	6	3.8333	2018.2
Blockchain	5	17.8	2021.0
Pandemic	5	3.6	2021.0
Healthcare entrepreneurship	5	0.8	2021.4
<i>Cluster 3: entrepreneurship models (6 keywords)</i>			
Artificial intelligence	6	17.6667	2020.8
Social enterprise	6	6.6667	2017.2
mHealth	5	39.8	2018.4
Institutional entrepreneurship	5	33.2	2016.8
Business models	5	24.8	2017.6
Global health	5	21.2	2015.2
<i>Cluster 4: education and empowerment (6 keywords)</i>			
Education	9	10.8889	2017.0
Nurses	8	16.625	2016.6
Nursing	8	13.5	2016.6
Empowerment	6	16.1667	2015.0
Entrepreneurs	6	4.8333	2017.7
Intrapreneurship	6	4.5	2019.7
<i>Cluster 5: systems and services (6 keywords)</i>			
India	9	28.1111	2016.3
Startups	8	6.75	2019.5
Public health	6	8	2016.3
Medical tourism	5	8	2019.6
Health system	5	2.6	2021.2
Health services	5	2	2014.4
<i>Cluster 6: orientations and opportunities (4 keywords)</i>			
Entrepreneurial orientation	9	6.8889	2017.1
Emerging markets	5	21.8	2016.8
Corporate entrepreneurship	5	10.2	2016.2
Healthcare industry	5	6.2	2018.8
<i>Cluster 7: choices and freedom (3 keywords)</i>			
Entrepreneurship	60	11.35	2018.1
Self-employment	6	3.3333	2018.3
Health care	5	5.6	2012.6
<i>Cluster 8: policy and impact (3 keywords)</i>			
Healthcare	64	11.0625	2017.4
Social entrepreneurship	21	18.4286	2018.0
Health policy	9	21.1111	2016.7

Source(s): Authors' own compilation

Table 3.
Major themes and
topics in healthcare
entrepreneurship
research

which could be fostered through shared vision, leadership, interdisciplinary partnerships and positive deviance (Melnyk and Davidson, 2009). They also highlighted the impact of startup programs (e.g. entrepreneurial attitude, entrepreneurial intention, entrepreneurial empowerment, entrepreneurial self-efficacy and entrepreneurship), which may be rolled out through entrepreneurship camps (Neergård *et al.*, 2022) or management strategy simulations (Lim *et al.*, 2021), as well as the role of intrapreneurship as drivers of innovation in healthcare (e.g. among nurses) (Ferraz *et al.*, 2021).

Systems and services. Cluster 5 encapsulates 6 keywords – i.e. “India”, “startups”, “public health”, “medical tourism”, “health system” and “health services” – that reflect healthcare entrepreneurship research pertaining to *systems and services*. Scholars in this cluster explore the startup ecosystem, which has been driven in recent years by the digital revolution with Industry 4.0, including in healthcare (Bhatt *et al.*, 2022). They have also explored specific segments of health system and services such as medical tourism, revealing the importance and value of the enterprising self in expanding the boundaries of healthcare (Muth and Suryanarayan, 2020) and showed how the service divide in healthcare could be bridged through digitally-enabled service innovations (Srivastava and Shainesh, 2015) and how health technology assessments (HTAs) could ensure the smooth confluence of technology, innovation and policy in realizing the positive impacts of health innovation emerging from healthcare entrepreneurship (Mukherjee, 2021).

Orientations and opportunities. Cluster 6 entails 4 keywords – i.e. “entrepreneurial orientation”, “emerging markets”, “corporate entrepreneurship” and “healthcare industry” – that reflect healthcare entrepreneurship research relating to *orientations and opportunities*. Scholars in this cluster highlight the role of achievement motivation and locus of control as factors of entrepreneurial orientation (Knežević *et al.*, 2021). They also reveal the stimuli of entrepreneurial activities like the autonomy of involved actors, collaborative and entrepreneurial mindset of healthcare leaders, policymakers and employees, technological and social development and the market environment, which, in turn, can contribute to improving the quality and efficiency of healthcare (Brandt and Znotka, 2021), including mitigating the potential of burnout among healthcare professionals (Kearney *et al.*, 2020) and strengthening sustainable corporate entrepreneurship in terms of increased internal corporate venturing, strategic entrepreneurship and competitive capability (Urban and Maboko, 2020).

Choices and freedom. Cluster 7 includes 3 keywords – i.e. “entrepreneurship”, “self-employment” and “health care” – that reflect healthcare entrepreneurship research pertaining to *choices and freedom*. Studies in this cluster highlighting the importance of enabling environments to promote healthcare entrepreneurship. For example, Kuo and Lin (2020) observe a natural experiment where a universal health insurance program that extended health insurance coverage to all citizens increased the likelihood of being an entrepreneur. This extends the work of Salvino *et al.* (2014), who find that federal healthcare subsidies have disproportionately benefitted larger firms and thus contributing to the decline in the rate of self-employment. Other scholars such as Zandberg (2021) show that better access to reproductive healthcare increases the likelihood for women to engage in entrepreneurship.

Policy and impact. Cluster 8 is made up for 3 keywords – i.e. “healthcare”, “social entrepreneurship” and “health policy” – that reflect healthcare entrepreneurship research relating to *policy and impact*. Studies in this cluster highlights a myriad of policies that could influence healthcare entrepreneurship such as gender policies seeking to transform the landscape of healthcare entrepreneurship through gender mainstreaming (Kuhlmann and Annandale, 2012), performance-based financing policies for healthcare entrepreneurs (Sieleunou *et al.*, 2017) and innovation policies that seek to stimulate venture capital investments in healthcare enterprises (Lehoux *et al.*, 2016). They also show the impact of healthcare entrepreneurship, particularly through the lens of social entrepreneurship, in

rising to the challenge of healthcare reforms through entrepreneurial and intrapreneurial initiatives (Wilson *et al.*, 2012). Scholars such as Farmer and Kilpatrick (2009) further reaffirm that healthcare entrepreneurship is a form of social entrepreneurship, with evidence from rural health professionals whose many community activities resulted in social outcomes relating to health, while scholars such as Ketprapakorn and Kantabutra (2022) introduce a sustainable social healthcare enterprise development model with core components involving wellbeing, social vision, values and norms, knowledge and local and international impact.

3.3.1 Theoretical implications. The realm of healthcare entrepreneurship, much like the broader scope of the healthcare sector, exists at the confluence of empirical reality and evolving theoretical paradigms. As we delve into the nuances of the major themes and topics underpinning this field, the ripple effects on theoretical understandings become increasingly evident. Each cluster and corresponding study not only fills gaps in our present knowledge but reshapes the contours of existing theories and occasionally births new ones. The theoretical implications arising from this vast body of research signal both a consolidation of what we know and an invitation to further inquiry. It is a testament to the dynamism of healthcare entrepreneurship as a field of study. The subsequent sections aim to unearth and elaborate on these theoretical insights, offering scholars a fresh lens through which to approach and contribute to the ongoing discourse.

Integrative framework for healthcare entrepreneurship. The delineation of eight distinct clusters/themes suggests that the development of an integrative framework for healthcare entrepreneurship is necessary. Such a framework should encapsulate the interplay of various elements like innovation, technology, education, policy and diverse entrepreneurship models. By studying healthcare entrepreneurship through this integrative lens, researchers can address the complexities of healthcare entrepreneurship more holistically. This calls for a scientific movement that encourages interdisciplinary collaboration, ensuring that all facets of healthcare entrepreneurship, from technological innovations to policy implications, are adequately addressed.

Evolutionary role of technology and innovation in healthcare entrepreneurship. The emphasis on innovation, leadership, technology and disruption, especially in the first and second cluster, signals a theoretical shift in how healthcare entrepreneurship should be perceived. Healthcare entrepreneurship cannot and must not be limited to the confines of traditional enterprises. Instead, it is evolving into a platform of continuous, dynamic innovation. As the world grapples with unprecedented challenges, such as public health crises, global supply chain disruptions and technological revolutions, the theorization of phenomena surrounding healthcare entrepreneurship need to evolve, highlighting the imperative for agile and adaptive entrepreneurial models that can swiftly respond to disruptions.

Recognition of entrepreneurial diversity in healthcare entrepreneurship. The findings from the third cluster underline the variety of models within healthcare entrepreneurship, signaling the theoretical acknowledgment that healthcare entrepreneurship is not monolithic. The existence of a myriad of models, ranging from ventures driven by artificial intelligence to initiatives focusing on global health, implies that theoretical frameworks and underpinnings of healthcare entrepreneurship need to be adaptive and flexible. They should recognize and accommodate the wide spectrum of approaches in healthcare entrepreneurship, emphasizing the absence of a singular, universal model.

Shaping the next generation of healthcare entrepreneurs through entrepreneurship education. The spotlight on education and empowerment through the fourth cluster points toward an often-underestimated aspect of healthcare entrepreneurship – the cultivation of an entrepreneurial mindset among healthcare professionals. From a theoretical standpoint, it accentuates the notion that healthcare entrepreneurship's roots lie in education and empowerment. Theoretical frameworks need to elucidate the pathways through which educational initiatives can spark innovation in healthcare, shaping a generation of

professionals who are not just skilled in their specialties but are also entrepreneurial in their endeavors.

Entrepreneurial synthesis of healthcare systems and services. The emphasis on systems and services in the fifth cluster posits a theoretical challenge: how do we integrate entrepreneurial ventures seamlessly into established health systems? Theories must delve into the intricate relationship between budding startups and established healthcare entities, exploring collaboration, integration and potential competition.

Recognition of intrinsic and extrinsic entrepreneurial orientations in healthcare. The significance of entrepreneurial orientations, as illustrated in the sixth cluster, brings to the fore a dual theoretical challenge. On one hand, there is a need for theoretical models that encapsulate intrinsic factors like motivation and mindset. On the other, these models must also account for extrinsic factors, such as market conditions and the broader policy landscape. The theoretical exploration of healthcare entrepreneurship should, therefore, be both introspective and extrospective, capturing the multifaceted nature of the field.

Positioning healthcare entrepreneurship within the policy landscape. The revelations from the seventh and eighth cluster underscore a pivotal observation: healthcare entrepreneurship operates within the context of broader health and economic policies. This suggests that theories of healthcare entrepreneurship cannot be isolated from the dynamic interplay of policy landscapes. Future theoretical frameworks should articulate this relationship, capturing how policies can both enable and constrain healthcare entrepreneurial ventures.

Towards dual-motivation healthcare entrepreneurial models. One of the most striking theoretical implications is the positioning of healthcare entrepreneurship within the broader realm of social entrepreneurship. The findings suggest that motivations in healthcare entrepreneurship often transcend mere profit, extending into social outcomes. Therefore, any theoretical advancement in the field must recognize this dual motivation, ensuring that models are framed with both profit (return on investment) and social impact (return on value) at their core.

The theoretical landscape of healthcare entrepreneurship stands at a pivotal juncture. The profound insights from the analysis provide a compass for future academic endeavors, ensuring that emerging theories are not only reflective but also predictive of the complex, multifaceted realities of healthcare entrepreneurship.

3.3.2 Practical implications. The evolution of healthcare is perpetually intertwined with the innovations and disruptions ushered in by entrepreneurship. As our understanding of healthcare entrepreneurship deepens, it is evident that its implications extend beyond theoretical contours and have tangible, actionable ramifications for a myriad of stakeholders. From the corridors of hospitals to the boardrooms of venture capitalists, from the classrooms of medical schools to the chambers of policymakers, the findings from the major themes and topics in healthcare entrepreneurship research chart a roadmap. This roadmap, laden with opportunities and challenges, requires strategic navigation. The onus is on key stakeholders, whether they are healthcare managers, investors, educators, or policymakers, to interpret these findings and translate them into pragmatic actions. The following sections delineate tailored recommendations, offering a comprehensive guide to harnessing the promise of healthcare entrepreneurship effectively and efficiently.

Be entrepreneurial in embracing technological integration of healthcare systems. With the emergence of themes emphasizing technological disruptions and innovations, notably from the first and second clusters, there is an urgent call for healthcare system administrators and hospital managers to be at the forefront of integrating technological advancements into their operations. This extends beyond merely adopting the latest technologies. Healthcare managers should actively seek collaborations with tech startups, particularly those highlighted under the *disruption and technology* cluster, such as digital health platforms and blockchain solutions. By doing so, healthcare systems can enhance their service

delivery, streamline patient data management and potentially revolutionize patient care paradigms.

Diversify entrepreneurial avenues in healthcare. The variety of entrepreneurial models showcased in the third cluster necessitates healthcare investors and venture capitalists to broaden their horizons. Rather than concentrating their investments in traditional healthcare models, they should explore and financially back ventures dabbling in artificial intelligence (AI)-driven solutions, global health and telemedicine. This diversified approach will not only mitigate investment risks but will also cater to emerging healthcare needs of the 21st century.

Cultivate an entrepreneurial culture in educational institutions to shape and safeguard the future of healthcare entrepreneurship. The fourth cluster's emphasis on the power of education and empowerment in healthcare entrepreneurship is a clear signal for educational institutions, especially medical and nursing schools. Deans and educational leaders should revisit their curricula, infusing them with entrepreneurial training modules. This might mean collaborating with business schools to design hybrid courses or even introducing entrepreneurial bootcamps specifically tailored for healthcare students. Such initiatives can prepare the next generation of healthcare professionals to be not just caregivers but also innovators.

Bridge the gap between healthcare startups and established systems. For healthcare policymakers and regulators, insights from the fifth cluster present an interesting challenge and opportunity. While the rise of healthcare startups, particularly in regions undergoing digital revolutions, is promising, there is a need to ensure they align with and complement existing healthcare systems. Policymakers should design frameworks encouraging partnerships between startups and established healthcare providers. Such alliances can expedite the integration of innovative solutions into mainstream healthcare, ensuring a wider reach and quicker adoption.

Design entrepreneurial work environments to support healthcare entrepreneurship. In light of the findings from the sixth cluster, human resource managers in healthcare facilities, both large and small, should be proactive in fostering a conducive environment for entrepreneurial orientations. This might involve creating in-house innovation hubs, organizing regular ideation sessions, or even facilitating external workshops that equip healthcare professionals with entrepreneurial tools and mindsets. Such initiatives can inspire and empower professionals to be intrapreneurs, innovating from within the organization.

Engage in constructive policy dialogs for healthcare entrepreneurship. The entwined relationship between healthcare entrepreneurship and policies, especially evident from the seventh and eighth clusters, presents a unique recommendation for both entrepreneurs and policymakers. Healthcare entrepreneurs should not remain passive observers of the policy landscape. They should form coalitions, engage in constructive dialogs with policymakers and play a part in shaping regulations that impact their ventures. On the flip side, policymakers should actively seek feedback from entrepreneurs, ensuring that policies are not stifling innovations but rather fostering a thriving entrepreneurial ecosystem.

Merge profit with purpose for social impact via healthcare entrepreneurship. For healthcare entrepreneurs and their investors, the recurring theme of social outcomes across clusters should serve as a guiding principle. In the race to profitability, the core mission of healthcare—to provide care and improve well-being—should not be overshadowed. Entrepreneurs should design business models that merge profitability with purpose. Investors, while seeking returns, should also measure the social impact of their investments, ensuring that the ventures they back are contributing positively to societal health.

Incorporating these managerial recommendations, tailored for distinct stakeholders, can holistically elevate healthcare entrepreneurship. By ensuring that each stakeholder—from investors to educators, from policymakers to entrepreneurs—plays their part effectively, we can foster an environment where innovations thrive, policies support and healthcare outcomes flourish.

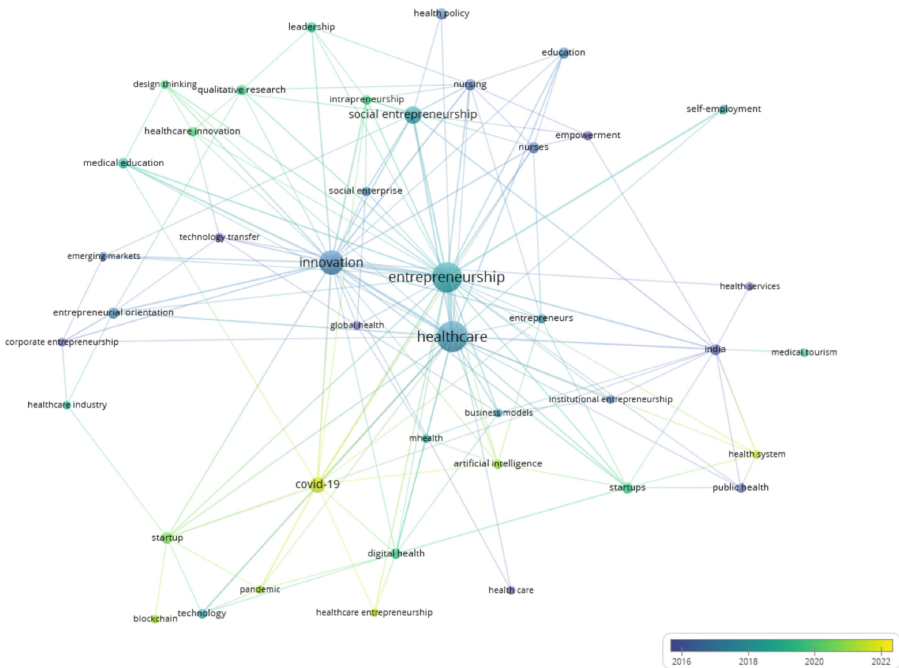
Figure 4.
Topical evolution of
healthcare
entrepreneurship
research

3.4 Future directions for healthcare entrepreneurship research (RQ4)

The average publication year of topics on healthcare entrepreneurship is indicated in [Table 3](#) and the trajectory of research in the field is illustrated using an overlay visualization in [Figure 4](#). Temporal retrospection and futures prospecting are engaged to curate the future directions for healthcare entrepreneurship research, which will be presented in the next sections.

3.4.1 How has the field developed? The field concentrated on “health services”, “technology transfer”, “empowerment” and “global health” early on around 2014 to 2015 before moving on to “corporate entrepreneurship”, “public health”, “nurses”, ‘nursing”, “health policy”, “emerging markets”, “institutional entrepreneurship”, “education”, “innovation”, “entrepreneurial orientation”, “social enterprise”, “healthcare”, “business models” and “entrepreneurs” between 2016 and 2017. In the build up to the COVID-19 pandemic around 2018 to 2019, the field focused on “social entrepreneurship”, “entrepreneurship”, “technology”, “self-employment”, “mHealth”, “medical education”, “healthcare industry”, “leadership”, “startups”, “digital health”, “qualitative research”, “medical tourism”, “intrapreneurship”, “design thinking” and “healthcare innovation”. The field during the period of COVID-19 pandemic to endemic between 2020 and 2022 witnessed the rise of publications around “startup”, “artificial intelligence”, “blockchain”, “pandemic”, “health system”, “healthcare entrepreneurship” and “covid-19”.

3.4.2 How can the field be further developed? Given the observed trajectory of healthcare entrepreneurship research alongside the discussion of major themes and topics in the field, several noteworthy reflections and promising pathways are available to inform future endeavors intending to advance the body of knowledge on healthcare entrepreneurship ([Table 4](#)).



Source(s): Authors' own compilation

Future research directions	Future research questions	Diving deeper into the future
1. Internal and external view of healthcare entrepreneurship	1. How can internally processes in healthcare facilities be optimized for nurturing entrepreneurial activities?	1.1 What role do organizational culture and leadership play in fostering an entrepreneurial mindset within healthcare facilities? 1.2 How can healthcare facilities leverage innovation and technology to support entrepreneurial activities? 1.3 What best practices can be adopted from other industries to optimize internal processes for healthcare entrepreneurship?
	2. How can external healthcare environments better facilitate the growth and success of entrepreneurial ventures?	2.1 What policies and regulations need to be in place to support healthcare entrepreneurs? 2.2 How can healthcare ecosystems be developed to foster collaboration and resource sharing among entrepreneurs? 2.3 What role do financial institutions and investors play in supporting healthcare entrepreneurship, and how can their engagement be enhanced?
2. Resilience of healthcare entrepreneurs and enterprises in disruptive, volatile, uncertain, complex, and ambiguous (DVUCA) environments	3. What specific tools and strategies can be developed to aid healthcare entrepreneurs in facing DVUCA challenges?	3.1 How can healthcare entrepreneurs be trained to develop resilience and adaptive capabilities? 3.2 What are the key risk management strategies for healthcare entrepreneurs in DVUCA environments? 3.3 How can technology be leveraged to provide support and resources for healthcare enterprises in times of disruption?
	4. How can healthcare enterprises develop dynamic capabilities to foster a competitive and innovative culture?	4.1 What are the specific dynamic capabilities required in the healthcare sector? 4.2 How can continuous learning and adaptability be embedded within healthcare enterprises? 4.3 What role does leadership play in fostering an innovative and resilient organizational culture in healthcare enterprises?
		(continued)

Table 4.
Future agenda for
healthcare
entrepreneurship
research

Future research directions	Future research questions	Diving deeper into the future
3. Global perspective on healthcare entrepreneurship	5. What are the specific challenges and opportunities of healthcare entrepreneurship in less developed countries?	5.1 How do infrastructure and resource limitations impact healthcare entrepreneurship in less developed countries? 5.2 What are the unique cultural and societal factors that influence healthcare entrepreneurship in less developed countries? 5.3 How can global partnerships and networks be leveraged to support healthcare entrepreneurs in less developed countries?
	6. How do cultural contexts influence healthcare entrepreneurship in various regions?	6.1 What are the key cultural dimensions that impact entrepreneurial activities in healthcare? 6.2 How does the political climate and social sentiment in different regions affect healthcare entrepreneurship? 6.3 What strategies can be employed to navigate and leverage cultural diversity in global healthcare entrepreneurship?
4. Entrepreneurship education for healthcare entrepreneurship	7. How can entrepreneurship education be tailored to meet the specific needs of the healthcare sector?	7.1 What are the key competencies and skills required for healthcare entrepreneurs, and how can they be integrated into educational programs? 7.2 How can real-world experiences and case studies be used to enhance learning and application in healthcare entrepreneurship? 7.3 What role do mentoring and networking play in entrepreneurship education for healthcare, and how can they be facilitated?
	8. What is the impact of entrepreneurship education programs on various manifestations of entrepreneurship in healthcare?	8.1 How do different educational approaches impact the development of entrepreneurial mindsets and capabilities in healthcare professionals? 8.2 What is the long-term impact of entrepreneurship education on the success and sustainability of healthcare ventures? 8.3 How can the effectiveness of entrepreneurship education programs in healthcare be measured and evaluated?

Table 4.

(continued)

Future research directions	Future research questions	Diving deeper into the future
5. Transformative revolution in healthcare entrepreneurship	9. How is the rise of generative artificial intelligence (AI) like ChatGPT influencing healthcare entrepreneurship?	9.1 What are the potential applications and implications of AI technologies in healthcare entrepreneurship? 9.2 How can healthcare entrepreneurs leverage AI to create innovative business models and solutions? 9.3 What are the ethical considerations and challenges associated with the integration of AI in healthcare entrepreneurship?
	10. What opportunities and challenges does the emergence of the metaverse present for healthcare entrepreneurs?	10.1 How can the metaverse be utilized to create innovative healthcare products and services? 10.2 What are the potential risks and challenges associated with conducting healthcare entrepreneurship in the metaverse? 10.3 How can healthcare entrepreneurs prepare and adapt to the rapidly evolving landscape of the metaverse?

Source(s): Authors' own compilation

Table 4.

Firstly, healthcare entrepreneurship can be viewed internally and externally. The internal viewpoint implies that future research efforts can be channeled to examine *how entrepreneurship in healthcare can be nurtured and supported*, whereas the external viewpoint suggests that future research efforts can be invested to investigate *how healthcare can support the proliferation and success of entrepreneurship*.

Secondly, healthcare entrepreneurship is not immune to disruptions. There is also a noticeable lack of taxonomies or toolboxes that healthcare entrepreneurs can rely on to not only survive and stay resilient but also safeguard transient and sustainable competitive advantages to continue to grow and prosper in a disruptive, volatile, uncertain, complex and ambiguous (DVUCA) environment. Therefore, future research efforts can be directed to *develop a taxonomy or toolbox of strategies, tactics and tools that can be used to foster a competitive, innovative and resilient culture in healthcare enterprises*, including the *dynamic capabilities* (Kraus *et al.*, 2023), *intellectual capitals* (Schiavone *et al.*, 2022a) and *enabling environments* (Soni *et al.*, 2022; Ciasullo *et al.*, 2023) that will be required.

Thirdly, healthcare entrepreneurship remains underexplored in developing and less developed countries, especially in the Global South. In this regard, there is a need to *engage in context-specific investigations*, including that which is *cross cultural* (Schiavone *et al.*, 2021) or that which targets *market segments* such as older adults (Schiavone *et al.*, 2022b), in order to *unpack the peculiarities that can shape our understanding of the varied nuances of healthcare entrepreneurship* and *how we will need to respond to support the growth and scale the impact of healthcare by means of entrepreneurship*.

Fourthly, healthcare entrepreneurship is reliant on entrepreneurship education as much as with entrepreneurs themselves. While existing studies on entrepreneurship education programs have documented such as entrepreneurship camps (Neergård *et al.*, 2022) and management strategy simulations (Lim *et al.*, 2021), the evidence and scope of impact will

need to expand. Given that entrepreneurship could occur internal (i.e. corporate entrepreneurship or intrapreneurship) and external (i.e. entrepreneurship or social entrepreneurship) to the organization, as well as in formal (i.e. startup and scaleup ventures) and informal (i.e. entrepreneurial attitude and mindset in work) ways, future research efforts can *develop innovative entrepreneurship programs* and *map the impact outcomes to the various manifestations of entrepreneurship*.

Finally, healthcare entrepreneurship, like other business or entrepreneurial ventures in any industry, is in the midst of transitioning from a digital revolution to a transformative revolution (Lim, 2023). In this regard, future research efforts will need to account and respond to recent trends such as the proliferation of generative artificial intelligence such as ChatGPT (Lim et al., 2023) and the rise of the metaverse (Kraus et al., 2023) in a timely and relevant manner so that entrepreneurship continues to drive innovative that enables healthcare to transition and even leapfrogged, into advances that will greatly benefit public health and the society.

4. Conclusion

To this end, this article has accomplished its goal to deliver an overview of healthcare entrepreneurship, both in terms of its current trends and future directions. Noteworthy, the article finds that healthcare entrepreneurship research has fared reasonably well in terms of publication productivity and impact. The article also shows diverse contributions coming from authors, institutions and countries, as well as a range of monetary and non-monetary support from funders and journals in relation to healthcare entrepreneurship research. The article also reveals eight major themes of healthcare entrepreneurship research – namely, *innovation and leadership, disruption and technology, entrepreneurship models, education and empowerment, systems and services, orientations and opportunities, choices and freedom and policy and impact*. The article concludes with a collection of noteworthy reflections accompanied by a set of promising pathways that can be used to guide the future research efforts.

Nevertheless, this article remains limited to the accuracy and completeness of the database that was used (i.e. Scopus), as well as to the limitations of bibliometrics or scientometrics analysis (i.e. overview). Though legitimate and justified, future reviews may wish to engage in alternative databases (e.g. Web of Science) and review methods (e.g. content analysis using frameworks and meta-analysis) to supplement the insights herein this review (Kraus et al., 2022; Lim et al., 2022). Similarly, the scope – and by extension, the search keywords – of this article was limited to healthcare entrepreneurship in line with the theme of the special issue. Therefore, future reviews are encouraged to explore closely-related forms of entrepreneurship, for example, medical entrepreneurship, which is more specialized, predominantly revolving around innovations in medical practice (e.g. medical tourism) and supplies (e.g. pharmaceuticals). While there is an inherent overlap with healthcare, medical entrepreneurship is narrower, more clinician-centric and often more focused on tangible products or specific medical services.

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