

# A bibliometric analysis on emerging technology research and development

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## ABSTRACT

Virtual reality (VR) refers to simulated, computer-generated environments in which a person becomes part of a virtual world or is immersed within this environment and, whilst there, is able to manipulate objects or perform a series of actions. The advancement of this emerging technology requires the sharing of discoveries and knowledge by both individual researchers and research teams. The purpose of this study was to undertake a bibliometric analysis of articles pertaining to VR research and development. Methods: This study retrieved data from the Science Citation Index Expanded and the Social Science Citation Index Expanded sections of the Web of Science. The keyword “virtual reality” was used to search for full articles published between 1993 and 2017. The retrieved articles were analysed by year, country of origin, journal, institution, and citation number. In addition, the core journals were identified based on Bradford’s law of scattering. Results: The literature relating to VR contained 11,150 articles from 96 countries released between 1993 and 2017. The majority of articles originated from the USA, with 3,482 articles (31.23%), the UK, with 1,204 articles (10.80%), and Germany, with 886 articles (7.95%). The articles were published in 223 subjects detailed by the Journal Citation Report’s subject classification. Among the 223 subjects, the top 30 subject areas can be roughly categorised into computer science, psychology, and medical groups. On the other hand, the top three institutional publishers were University College London (UCL), the University of Toronto, and the University of Washington. The most frequently cited article, by Seymour et al., demonstrated VR training in an operating room, and was published in the *Annals of Surgery* in 2002, and, as of September 2018, has been cited 1,375 times. The core zone of the four-zone division contains 34 journals, and published 2,780 articles. Conclusions: The data indicate that VR articles have grown steadily over the period studied. The trend reveals that VR research is likely to fall at the growth stage, and so more research and development outputs may occur in the near future. In addition, this study has identified principle subject areas, core journals, prolific authors, and research institutions expected to contribute to VR research and development.

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## Keywords:

Informetric analysis, Virtual reality, Bibliometrics, Bradford’s law, Web of science.

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