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Investigating Scientific Productions in the Field of Digital Citizen Science: A Scientometric Study

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Abstract

Purpose: This study aims to investigate the scientific production status in the field of Digital Citizen Science from 1971 to 2022 using the Scopus citation database.

Methodology: The present study utilizes a descriptive survey-analytical approach with a quantitative and scientometric method. The study population includes all scientific products related to Digital Citizen Science from 1971 to 2022 indexed in the Scopus database.

Findings: From 1971 to 2022, there has been a steady growth in scientific productions in the field of Digital Citizen Science. The top three active fields in this area are Environmental Sciences (9377 publications), Agricultural and Biological Sciences (8380 publications), and Social Sciences (8134 publications). The National Science Foundation and the European Union are leading research institutes in this field. Among countries, the United States, United Kingdom, and Australia are the top contributors. The co-occurrence of words also highlights the significant role of citizens in scientific production in this field.

Conclusion: The study of scientific products in the field of digital citizenship can serve as a roadmap for researchers within and outside the field. Given that Citizen Science is an interdisciplinary field that intersects with various scientific disciplines, it is worthwhile for science and technology policymakers in Iran to foster interdisciplinary collaborations with leading countries such as the United States, the United Kingdom, and Australia.

Value: This research signifies the first study that explores Digital Citizen Science in Iran.

Keywords: Digital Citizen Science, Citizen Science, Participatory Science, Scientific Productions, Scientometric.

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Extended Abstract

Introduction

Purpose: This study aims to investigate the scientific production status in the field of Digital Citizen Science from 1971 to 2022 using the Scopus citation database. Digital Citizen Science is an emerging research field.

Methodology: The present study utilizes a descriptive survey-analytical approach with a quantitative and scientometric method. The study population includes all scientific products related to Digital Citizen Science from 1971 to 2022 indexed in Scopus.

Findings: According to the research findings, a total of 29,497 scientific documents have been published in the journals indexed in Scopus citation database. Scientific research articles constitute the majority of these documents, accounting for approximately 71%, followed by conference articles (9.9%), reviews and critiques (8.9%), book chapters (5.2%), books (1.2%), notes (1.3%), editorials (1.1%), letters (0.5%), short surveys (0.2%), conference reviews (0.2%), and documents with unspecified types (0.3%).

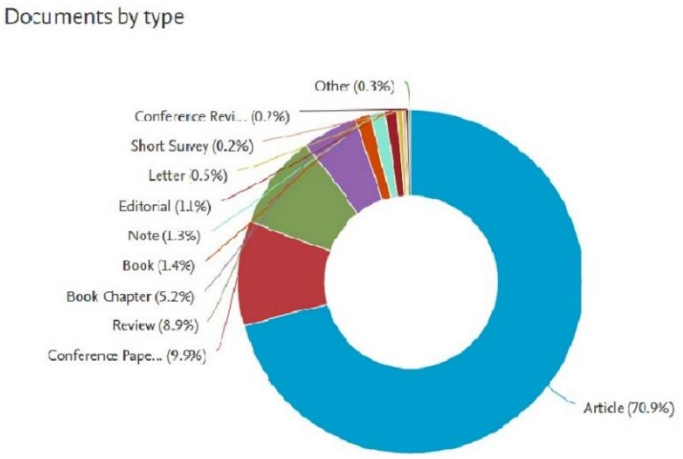

Figure 1. *Descriptive statistics of scientific productions in the field of Digital Citizen Science in terms of the document type*

The subject area of the published documents in the field of Digital Citizen Science is depicted in Figure 2. Environmental Sciences represent the largest proportion of these publications at 17.4%, followed by Agricultural and Biological Sciences (15.5%), Social Sciences (15.1%), and Computer Science (7.9%).

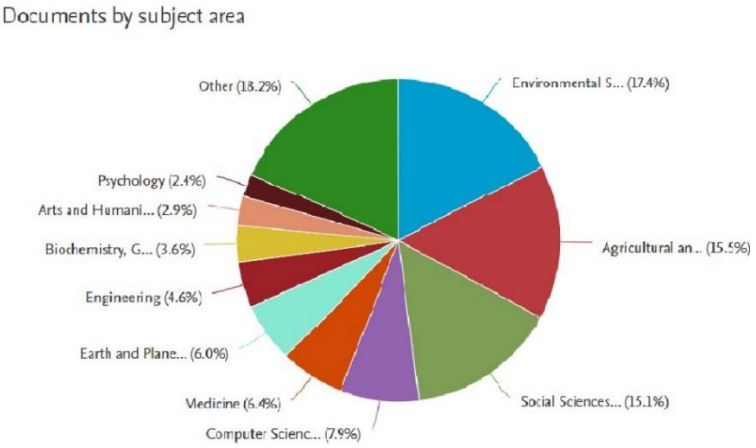

Figure 2. *Descriptive statistics of Digital Citizen Science field published documents*

Figure 2 also indicates the most active fields in terms of scientific publications in the field of Digital Citizen Science. The top 10 fields are Environmental Sciences (9377 publications), Agricultural and Biological Sciences (8380 publications), Social Sciences (8134 publications), Computer Science (4243 publications), Medicine (3431 publications), Earth and Planetary Sciences (3240 publications), Engineering (2473 publications), Biochemistry, Genetics, and Molecular Biology (1945 publications), Arts and Humanities (1580 publications), and Psychology (1284 publications).

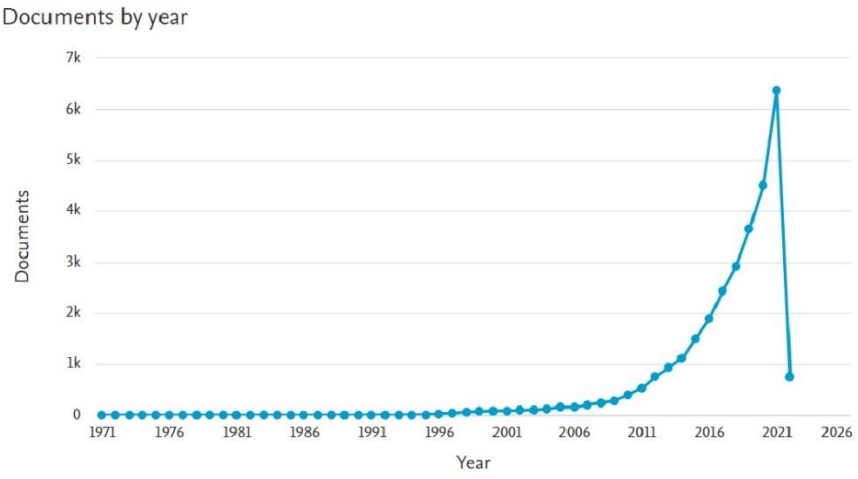

Figure 3. *The publishing trend of Digital Citizen Science field*

Figure 3 shows the growing trend of scientific productions in the field of Digital Citizen Science.

Figure 4 identifies the top 10 authors in this field. Fink. D. is the most prolific researcher with 56 publications, followed by C. L. with 55 documents, and Chang SS. with 52 documents. Other influential researchers include Brown. Pi (49 publications), Gordon VV. (49 publications), Gilbert JH. (48 publications), Huchaka v. M (44 publications), Trimachi S. (43 publications), Kalangan C. T, and Roy DB. (41 publications).

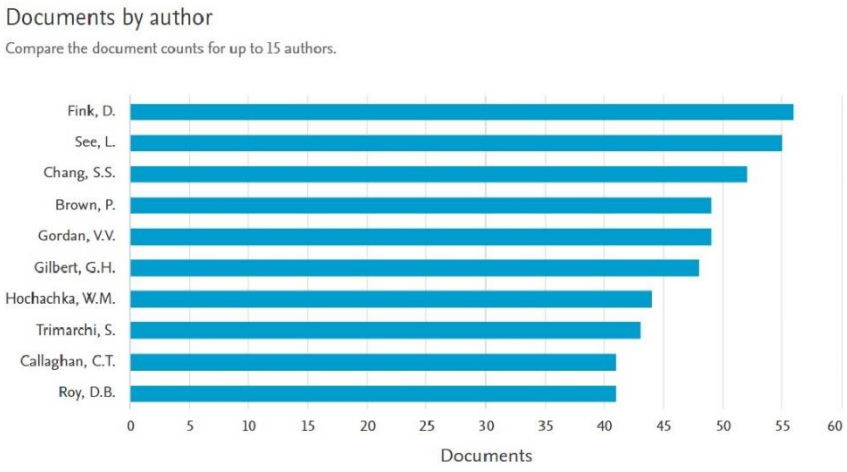

Figure 4. *Top researchers of Digital Citizen Science field*

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Additionally, a cooperation map of 2,472 authors was created based on the conditions of having at least five documents and receiving at least five citations among the 66,422 active authors in this field, as shown in Figure 5.

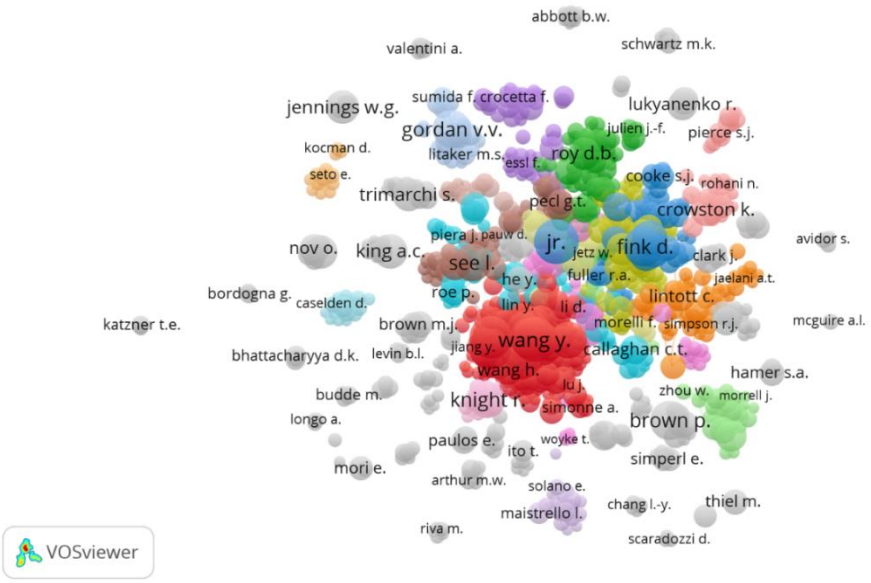

Figure 5. *The map of scientific collaborations of top researchers in Digital Citizen Science field*

Based on Figure 6, the top 10 organizations supporting research in the field of Digital Citizen Science have been identified. The National Science Foundation is the leading research institute with 1907 degrees of support, followed by the European Union with 679 degrees, and the Horizon 2020 program framework ranks second and third, respectively.

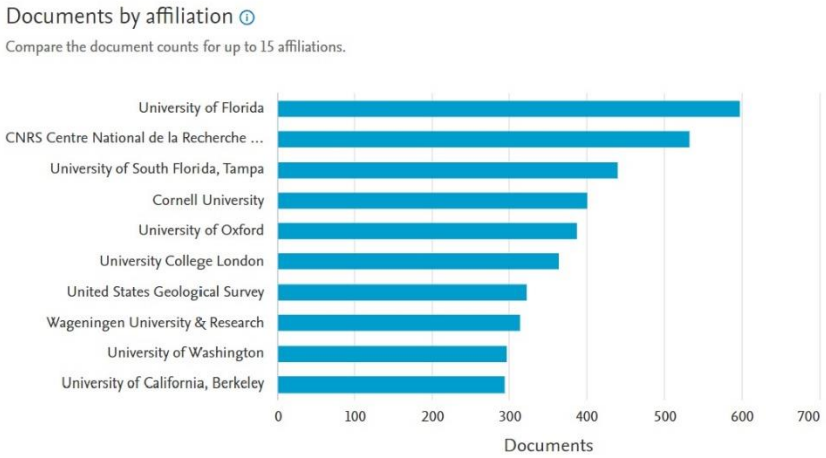

Figure 6. *Active universities of Digital Citizen Science field*

Figure 6 highlights the top 10 universities in terms of scientific production in the field. The University of Florida holds the first position with 579 publications, followed by the CNRS National Center for Scientific Research with 532 publications, and the University of South Florida, Tampa with 440 publications.

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Conclusion: Based on the scientometric analysis conducted in this research, it is evident that the concept of "Digital Citizen Science" has gained significant attention in the scientific literature over the past decade. It is worth noting that while this practice has a longer history, the advancements in digitalization have greatly expanded the possibilities and scope of this concept and its associated projects. Particularly in the fields of Environment, Biological Sciences, and Biological Protection, the utilization of digital platforms for voluntary contributions has led to a surge in scientific output. The availability of digital media has provided citizens with numerous benefits, ranging from ease of use to data validity and integration of their findings. Digital citizen science systems serve as prime examples of socio-technical systems, wherein scientists and the general public (volunteers) interact through technological means. These systems typically host various citizen science projects and allow volunteer participation and selection. Considering the novelty of the citizen science discussion in Iran and the dearth of research and organizational initiatives in this field, it is highly recommended for universities and research centers to model their outputs and results based on the experiences of top countries in this area and localize them accordingly. In doing so, they can align their political, research, and educational programs to foster new research opportunities within the country. One of the most significant achievements of this field is the collaborative management of societies, utilizing the expertise of scientific elites and citizens in collective leadership. Based on the findings of this research, the following recommendations are made:

Value: This research stands as the first study that comprehensively explains Digital Citizen Science in Iran.

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