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Digital Competences and Trends in Applications to Support Health Lifestyle

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ABSTRACTS

This research aims to analyze trends in researchers' behavior when researching sports applications to support a healthy lifestyle. Bibliometric analysis was used as a method in this research. Research data was collected via the Scopus page starting May 22, 2024. The keywords used were "Sport" AND "Application" "Health" AND "Lifestyle." Search results on the Scopus database found 100 documents from 79 publication sources. The development of article publications regarding sports applications to support a healthy lifestyle can increase yearly. Although, from the highest total publications in 2021, there was a decrease in the number of publications from 2020 to 2024. Fifty-five countries have contributed to publications regarding the use of sports applications to support a healthy lifestyle. The research results show that exercise is most popularly used yearly in research regarding using exercise applications to support a healthy lifestyle. This indicates that researchers use many sports applications as a medium for physical training and training for exercise. Hopefully, this research will become a reference and primary source for further research on using sports applications to support a healthy lifestyle.

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1. INTRODUCTION

According to the World Health Organization (WHO), a healthy lifestyle refers to how a person lives by reducing the potential risk of severe illness or the possibility of premature death. A healthy lifestyle is a behavior related to a person's efforts or activities to maintain and improve their health (Redland & Stuifbergen, 1993). One way that can be done to maintain a healthy lifestyle is to maintain a clean environment, exercise regularly, get enough rest, avoid fast food and alcoholic or carbonated drinks, and implement the four perfect health conditions. Physical activities such as exercise are critical to maintaining metabolism (Miles, 2007). WHO recommends doing sports activities for at least 30 minutes per day or 90 minutes per week (Wen, *et al., 2011*). Exercise itself has many benefits for physical and mental health. Exercise maintains body weight to prevent obesity, prevents heart disease, prevents diabetes, reduces the risk of osteoporosis, reduces stress, improves good sleep quality, and improves mood.

In the Industry 4.0 era, technology has developed rapidly and has become a vital tool in various aspects of life, including sports. One form of technological development in the world of sports is the availability of sports applications designed to improve the experience and performance of its users. Sports apps can offer various features such as physical activity tracking, training planning, performance analysis, and personalized nutritional advice. This application can provide real-time feedback and encourage more interactive and efficient participation by utilizing advanced technology such as artificial intelligence (AI) and the Internet of Things (IoT). Sports Application helps individuals achieve their fitness goals and enable the sports community to grow and connect more closely through an innovative digital platform.

Currently, a lot of research discusses sports applications to support a healthy lifestyle. Table 1 shows previous research that examines this theme. Peuters et al. (Peuters, *et al., 2024*) researched the effectiveness and underlying mechanisms of mobile health (mHealth) interventions to promote healthy lifestyles and mental health. In addition, Southcott & Jooste (Southcott & Jooste, 2024) researched the use of fitness applications as a behavior modification tool for people's motivation to maintain physical activity and exercise behavior. However, based on previous research, more research should be done on trend analysis regarding sports applications to support a healthy lifestyle. Therefore, this research aims to analyze trends in researchers' behavior when researching sports applications to support a healthy lifestyle. This research analyzes research developments, subject area analysis, Co-occurrence Network Visualization, and distribution of research contributions regarding sports applications to support a healthy lifestyle.

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Table 1. Previous research regarding sports applications to support a healthy lifestyle.

No.	Title	Year	Ref
1	A mobile, healthy lifestyle intervention to promote mental health in adolescence: a mixed-methods evaluation	2024	(Peuters, *et al., 2024*)
2	Unveiling the Impact of Mobile Fitness Applications on Motivational Orientation in Sustaining Exercise Behaviors: A Qualitative Investigation	2024	(Southcott & Jooste, 2024)
3	Electronic device and social network use and sleep outcomes among adolescents: the EHDLA study	2023	(Gaya, *et al., 2023*)
4	The effect of high-dose vitamin D supplementation and an exercise program to lose weight on some biochemical variables of overweight women	2023	(Hassan, *et al., 2023*)
5	Nothing in Excess: Physical Activity, Health, and Life World in Senegalese Fulani Male Pastoralists, a Mixed Method Approach	2023	(Chevé, *et al., 2023*)
6	The Use of Information Technology and Lifestyle: An Evaluation of Digital Technology Intervention for Improving Physical Activity and Eating Behavior	2023	(Rahayu, *et al., 2023*)
7	Relationship between Behavior and Periodontal Health Self-perception in Diabetic and Non-Diabetic Patients from Transylvania, Romania—A Self-Report Study, Including the Desire to Use a Mobile App for Oral Care Improvements	2023	(Badea, *et al., 2023*)
8	Assessment of the excretion of oxidative stress biomarkers and anabolic steroids based on sewage: A case study of college students and the general population	2023	(Gao, *et al., 2023*)
9	Applying motivational techniques for user adherence to adopt a healthy lifestyle in a gamified application	2023	(Fatima, *et al., 2023*)
10	The Influence of Previous Lifestyle on Occupational Physical Fitness in the Context of Military Service	2023	(Oja & Piksöött, 2023)

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2. METHOD

Bibliometric analysis was used in this research. Research data was collected via the Scopus page starting May 22, 2024. The keywords used were "Sport" AND "Application" "Health" AND "Lifestyle." Search syntax on the Scopus page: (TITLE-ABS-KEY (sports) AND TITLE-ABS-KEY (sports AND applications) AND TITLE-ABS-KEY (health) AND TITLE-ABS-KEY (lifestyle)) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English")). This research determines several provisions, including the research year range from 2002 to 2024, the language used by the article must be English, the publication stage must be final, and the type of publication is a journal type. After the search process and research data collection were successfully carried out, the next stage was processing and analyzing quantitative data based on the principles of bibliometric analysis. The VOSviewer and RStudio applications were used for bibliometric analysis. Detailed information on bibliometric use is described elsewhere (Al Husaeni & Nandiyanto, 2022).

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3. RESULT AND DISCUSSION

3.1. Annual Report Publication of Sports Application for Support Healthy Lifestyle

Search results on the Scopus database regarding sports publications for supporting a healthy lifestyle found 100 documents from 79 publication sources from 2002 to 2024. The number of publications regarding sports publications for supporting a healthy lifestyle in Scopus had an annual growth rate of 83.2%, with details in Figure 1. Figure 1 shows the details of the number of publications per year, namely: 2002 1 document, 2006 2 documents, 2007 1 document, 2008 3 documents, 2009 to 2012 there was 1 document, 2013 there were 3 documents, 2014 there were 8 documents, 2015 there were 2 documents, 2016 there were 4 documents, 2017 there were 7 documents, 2018 there were 9 documents, 2019 there were 7 documents, 2020 there were 10 documents, 2021 there were 16 documents, 2022 there were 10 documents, 2023 there were 11 documents, and 2024 there were 2 documents. Based on the data shown in Figure 1, the development of article publications regarding sports applications to support a healthy lifestyle is increasing yearly. However, from the highest total publications in 2021, there was a decrease in the number of publications from 2020 to 2024.

The increase in research regarding the use of sports applications to support a healthy lifestyle, especially in 2021, can be influenced by factors. One of the main factors is the COVID-19 pandemic, which has limited people's access to fitness centers and sports

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facilities, encouraging increased use of sports equipment and training via applications (Dewi, *et al., 2020*). Additionally, advances in mobile technology and wearable devices, which enable more accurate and easy tracking of physical activity and health (McConnell, *et al., 2018*), are driving the popularity of exercise apps. Increased awareness of the importance of maintaining physical and mental health amidst challenging situations also motivates many people to use the app to aid their fitness routine. Support from the technology and health industries and collaboration between app developers and fitness and nutrition experts also played an important role in driving research and widespread adoption of exercise apps during this period.

In this study, we analyzed the identification of developments in the use of sports applications to support a healthy lifestyle based on average citations per year. Publications regarding the use of sports applications to support a healthy lifestyle in Scopus have an average number of citations per document of 19.53. In contrast, a detailed report regarding the number of citations per year is shown in Table 2. The citation data shows that the highest average number of citations per article occurred in 2014, with an average per article of 56.25. Meanwhile, the highest average citation per year occurred in 2011, with an average of 5.50.

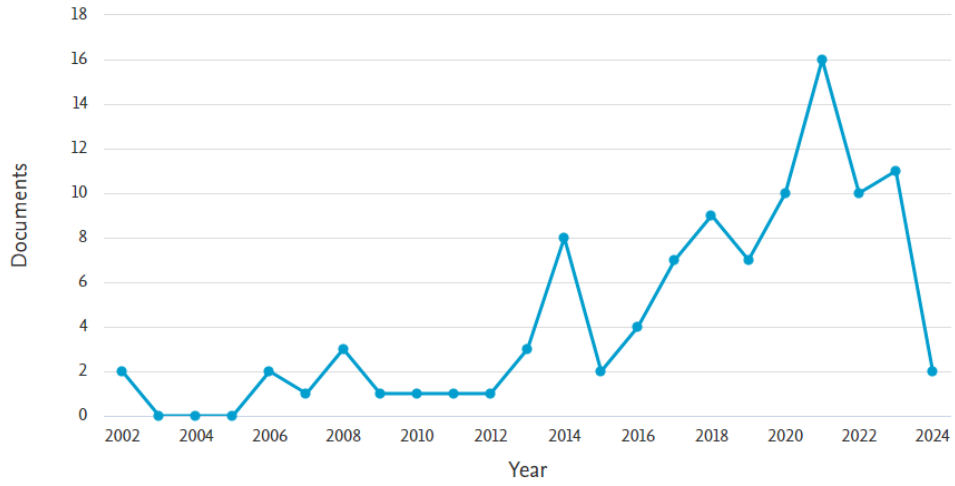

Fig. 1. Annual scientific production.

Table 2. Average citations per year.

Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2002	6	1.00	0.26	23
2006	26.5	2.00	1.39	19

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Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2007	25	1.00	1.39	18
2008	12.33	3.00	0.73	17
2009	82	1.00	5.12	16
2010	10	1.00	0.67	15
2011	77	1.00	5.50	14
2012	3	1.00	0.23	13
2013	79	3.00	6.58	12
2014	56.25	8.00	5.11	11
2015	40	2.00	4.00	10
2016	25.75	4.00	2.86	9
2017	13.14	7.00	1.64	8
2018	7.33	9.00	1.05	7
2019	17.43	7.00	2.90	6
2020	23.4	10.00	4.68	5
2021	12.88	16.00	3.22	4
2022	5.6	10.00	1.87	3

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Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2023	1.27	11.00	0.64	2
2024	0	2.00	0.00	1

The development of research regarding the use of sports applications to support a healthy lifestyle can be influenced by the COVID-19 pandemic, technological advances, health awareness, and industry support. Social distancing and gym closures have forced many people to seek alternative exercise at home, increasing interest in exercise apps that provide guidance and motivation. Additionally, innovations in mobile technology, sensors, and wearable devices have enabled sports apps to provide more accurate tracking, detailed health data analysis, and interactive user experiences. The influence of the development of online applications can also be caused by increasing public awareness of the importance of maintaining physical and mental health, thus encouraging them to use sports applications as part of their daily routine.

3.2. Collaboration With the Country in Publication Of Sports Applications For Support A Healthy Lifestyle

55 countries have contributed to publications regarding sports applications to support a healthy lifestyle. These countries are the United Kingdom, United States, China, Italy, Australia, Germany, Netherlands, Poland, Spain, Belgium, Canada, Romania, Russian Federation, Slovakia, Austria, Brazil, France, Turkey, Czech Republic, Finland, India, Indonesia, Israel, Portugal, Serbia, South Korea, Switzerland, Ukraine, Chile, Ecuador, Egypt, Estonia, Ghana, Greece, Hong Kong, Ireland, Latvia, Lithuania, Malaysia, Moldova, North Macedonia, Norway, Qatar, Rwanda, Saudi Arabia, Senegal, Taiwan, Uzbekistan, Viet Nam, and Yemen. Figure 2 shows collaborative research publications regarding the use of sports applications to support a healthy lifestyle. The countries that have contributed the highest number of publications are the United Kingdom with 14 publications, the United States with 11 publications, China with 10 publications, Italy with 8 publications, Australia with 7 publications, Germany with 6 publications, the Netherlands with 6 publications, Poland with 6 publications, Spain with 6 publications, and Belgium with 5 publications.

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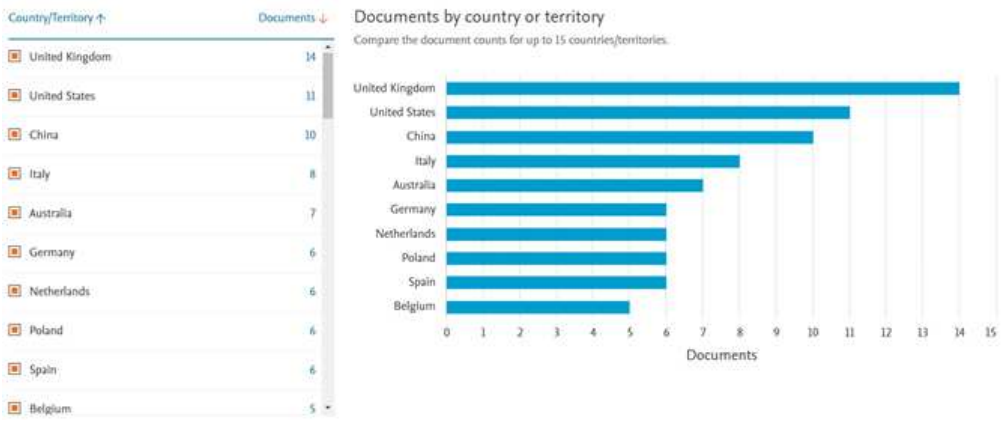

Fig. 2. Collaboration in the publication of sports applications to support a healthy lifestyle in a country by Scopus.

3.3. Trend in Publication of Sport Application for Support Healthy Lifestyle

We researched publication trends by analyzing terms or words in research publication documents regarding using sports applications to support a healthy lifestyle. Figure 3 shows the terms with the highest appearances in the abstract and title. Based on Figure 3, 10 terms are often used in research with this theme: exercise, which was found 64 times; human found 62 times; male found 57 times; female found 50 times; humans found 48 times, and found 46 times. Times, adult was found 38 times, physical activity was found 33 times, lifestyle was found 31 times, and adolescent was found 27 times.

Fig. 3. Most frequent words

Figure 4 shows a frequency graph of the 10 terms with the highest occurrences over time. Figure 4 shows that from 2002 to 2005, the words frequently used were adolescent and adult. In the following years, the terms used became more diverse. Figure 4 shows that there has been an increase in the use of the term exercise in research regarding the use of sports applications to support a healthy lifestyle; apart from that, the term exercise has also been the most widely used from 2018 to 2024. This shows that many researchers use sports applications as a medium for physical training and training for exercise (Peart, *et al., 2019;* Halperin, *et al., 2018*). A more detailed explanation regarding the development

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of this term from year to year is provided in Table 3.

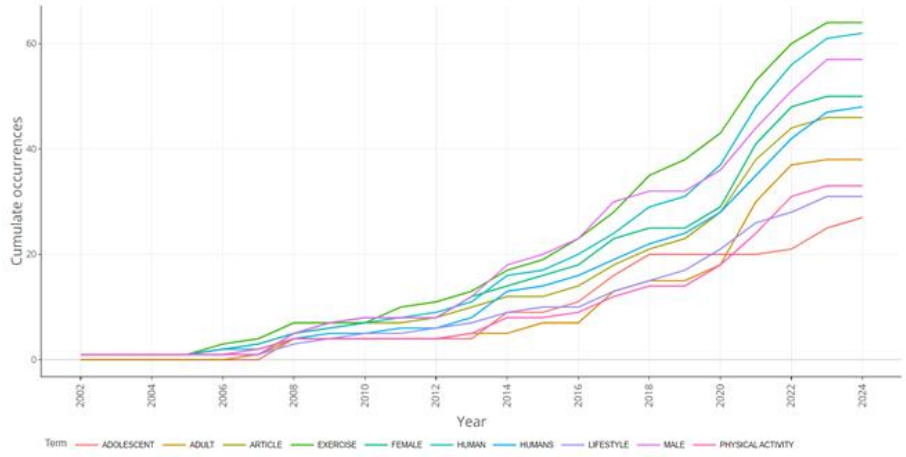

Fig. 4. Words' frequency over time.

Table 3. Word frequency details over time.

Year	Exercise	Human	Male	Female	Humans	Article	Adult	Physical Activity	Lifestyle	Adolescent
2002	1	1	1	1	1	1	0	1	1	0
2003	1	1	1	1	1	1	0	1	1	0
2004	1	1	1	1	1	1	0	1	1	0
2005	1	1	1	1	1	1	0	1	1	0
2006	3	2	1	1	2	2	0	1	1	0
2007	4	3	1	1	2	3	1	2	1	0
2008	7	5	5	5	4	5	4	4	3	4
2009	7	6	7	7	5	6	4	4	4	4
2010	7	7	8	8	5	7	4	4	5	4
2011	10	8	8	8	6	7	4	4	5	4

3.4. Co-occurance Network Visualiztion of Publication of Sport Application for Support Healthy Lifestyle

Figure 5 shows a co-occurrence network visualization of research on using sports applications to support a healthy lifestyle. Co-occurrence network visualization is a data visualization technique used to display the relationship between various elements based on the frequency of their occurrence in a dataset (Al Husaeni, 2022). This technique is often used in text analysis, information science, bioinformatics, and other fields that require understanding relationship patterns between different elements. In this research, each term is divided into four clusters.

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(i). Cluster 1: adolescent, health promotion, health behavior, child, sports, motivation, motor activity, internet, oxidative stress, procedures, and program evaluation.

(ii). Cluster 2: exercise, human, male, female, humans, article, adult, physical activity, lifestyle, sport, questionnaire, sedentary lifestyle, controlled study, obesity, middle-aged, lifestyle, health status, body mass, sports medicine, diet, priority journaling, and glucose.

(iii). Cluster 3: mobile application, aged, healthy lifestyle, mobile applications, randomized controlled trial, fitness, major clinical study, cross-sectional study, surveys and questionnaires, young adults, body weight, and health survey.

(iv). Cluster 4: quality of life, diabetes mellitus, walking, and resistance training.

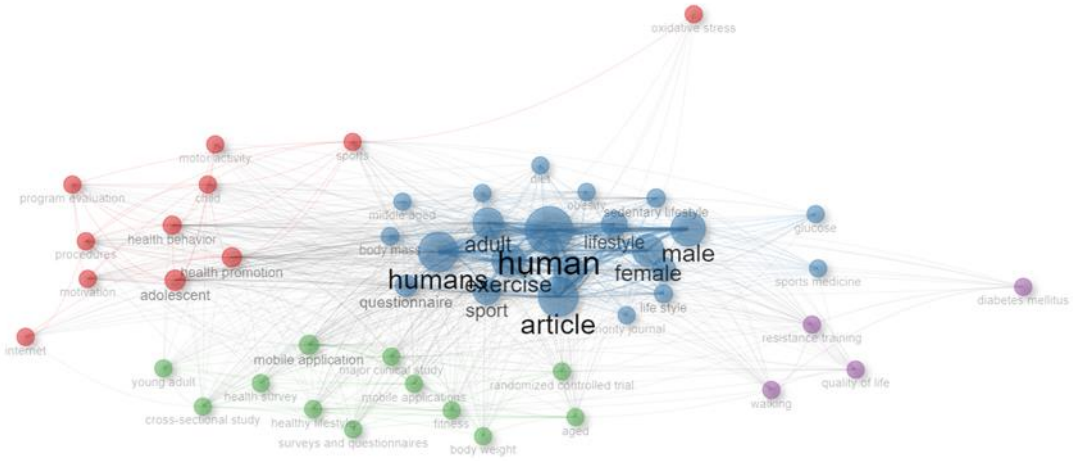

Fig. 5. Co-occurrence network visualization.

4. CONCLUSION

Search results on the Scopus database regarding sports publications for supporting healthy lifestyles found 100 documents from 79 publication sources from 2002 to 2024. The number of publications regarding sports publications for supporting healthy lifestyles in Scopus had an annual growth rate of 83.2%. The development of article publications regarding sports applications to support a healthy lifestyle increases yearly. Although, the highest total number of publications in 2021 saw a decrease in the number of publications from 2020 to 2024. The development of research regarding the use of sports applications to support a healthy lifestyle can be influenced by the COVID-19 pandemic, developments in technological progress, health awareness, and industry support. 55 countries have contributed to publications regarding sports applications to support a healthy lifestyle. Based on topic trend analysis in the research theme of sports publications for supporting healthy lifestyles, it was

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found that there were 10 terms frequently used in research with this theme: exercise, human, male, female, humans, article, adult, physical activity, lifestyle, and adolescent. The term exercise was used in research regarding the use of sports applications to support a healthy lifestyle, and the term exercise was also most widely used from 2018 to 2024. This shows that many researchers use sports applications as a medium for physical training and training for exercise.

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