国际太极拳专利技术领域情报可视化分析

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摘要：目的：2020 年 12 月 17 日，中国太极拳被列入人类非物质文化遗产代表作名录，中国太极拳国际化征程进入崭新的阶段。通过查阅太极拳相关文献发现，并没有太极拳的相关专利分析。专利作为凸显本领域内创新活力的一种受法律制度保护的专有性权力，其中蕴含着技术、法律和经济信息,是一种难得的综合信息资源。对国际太极拳相关专利的分析，可以获取国际太极拳专利最新发展情况,为我国太极拳专利技术的产出提供参考和借鉴依据。同时，为太极拳在国际的传播与认同的现状研究提供一个新的角度，为太极拳文化更好的挖掘、阐释和创新，乃至太极拳产业化发展都提供了一个新的思路。**方法：**（1）文献资料法　在中国知网（CNKI）中，以“太极拳”、“体育专利”为关键词分别进行检索（检索时间范围：2010-2021 年），以“TS=（tai chi OR taichi OR tai ji OR taiji OR tai ji chuan OR taijichuan OR tai ji quan OR tajiquan OR tai chi quan OR taichiquan）”为检索条件在德温特索引数据库中进行高级检索。在郑州大学图书馆、郑州大学体育学院图书馆查阅有关太极拳、专利技术、知识图谱可视化的相关书籍，并对太极拳、专利和知识图谱可视化分析的相关网站进行查阅和浏览。经过对上述文献阅读、整理、归纳后，直接引用了其中 15 篇文献作为国际太极拳专利分析的理论支撑。（2）文献计量与可视化分析法　本文借助 Citespace(5.6.R2)可视化软件对国际太极拳相关专利进行可视化分析，量性研究的同时结合质性研究。对德温特数据库 1963-2021 年收录的国际太极拳专利的专利年专利量、DMC 专利技术领域分布及热点演进趋势进行可视化分析，更加直观明了的研究分析国际太极拳的专利发展情况及未来演进趋势。（3）逻辑分析法　对国际太极拳专利相关图表、图谱数据信息进行整理归纳，推理分析。**结果：**从国际太极拳专利的时间分布来看，通过对国际太极拳专利年度发文量分析，国际太极拳专利年申请量整体上呈波动增长趋势。国际太极拳专利的空间分布情况如下：（1）从学科领域分布来看，1963-2021 年间国际太极拳专利技术共涵盖 18 个学科领域，主要涉及仪器、体育科学、工程设计、电讯技术领域、计算机科学等领域。其中太极拳专利涉及最多的为仪器领域，共有 356 篇。（2）从专利权人分布来看，1963-2021 年的国际太极拳专利共有 288 个专利权人，排名前 19 位的专利权人，全部来自中国。其中 10 个专利权为个人申请，7 个为高校申请，2 个来自公司申请。国际太极

拳专利的专利权人主要为个人和学校，以公司为依托的太极拳专利产出较少。（3）从主要发明人分布来看，1963-2021 年国际太极拳专利共有 454 位发明人参与。与其他体育项目的专利数量进行比较后，可得国际上有关太极拳的研发参与的发明人相对较少，但是对国际太极拳研究的前 20 位发明人进行分析发现，这些专利发明人都来自于中国。国际太极拳专利热点技术领域分析情况如下：（1）从国际太极拳专利 IPC 技术分布来看，国际太极拳专利共涉及 228 个技术领域，涉及 A 人类生活需要、B 作业；运输、C 化学；冶金、F 机械工程；照明；加热；武器；爆破、G 物理、H 电学这 6 个部。其中 A 部人类生活需要方面的专利数量最多，共有 140 项专利，占太极拳专利总数的 61.40%。IPC 热点技术领域主要属于 A63B（体育锻炼、体操、游泳、爬山或击剑用的器械；球类；训练器械）。（2）从国际太极拳专利 DMC 分布来看，国际太极拳专利技术出现频次最高的技术领域有运动训练和健身训练、训练设备、用于运动和训练设备的计算机处理等。多个代码在一个专利中同时出现，说明一个专利中可应用到多个技术领域。主要的德温特手工代码专利技术热点领域主要集中在太极拳运动训练中的的器械、设备和服装等方面，专利方向主要为太极拳健身和教学方面，也涉及到竞技领域和医疗领域。国际专利技术的核心专利分布情况如下：（1）从被引频次前 15 项核心专利分布来看，国际太极拳核心专利主要集中在中国和美国，中国的被引高频文献最多。由专利主题分析发现，专利多开发的是太极拳方面的健身功能，其在竞技方面的专利开发较少。除专门为太极拳所设计的相关专利外，大部分专利其功能可应用于太极拳领域的同时也可应用到其他领域。（2）从核心专利主要专利权人分布来看，核心专利的主要专利权人多属于中国和美国，中国在太极拳核心专利研究中具有一定的优势，核心专利的专利权人多为公司和高校。**结论：**（1）国际太极拳专利的申请虽未形成连续的逐年递增趋势，但仍总体上呈增长趋势。（2）太极拳运动其自身的限制性，相对于其他运动项目专利涉及的学科领域较少，但太极拳专利技术仍具有多学科研究领域交叉融合的特点。太极拳相关专利整体具有多学科交融特点外，其单个专利也多涉及多个学科领域。（3）相比于国际上专利权大多属于公司的诸如篮球、网球、羽毛球等市场化、产业化程度较高的体育项目，太极拳仍是一项具浓厚本土色彩的体育项目，国际化程度相对较低的同时，市场转化率低，专利利用率低。（4）中国拥有较多的太极拳专利发明人才，是太极拳专利发明的主力军。主要专利发明人的发明专利产出大多是来自个人或是依托学校，还有一些发明人有着共同的发明合作团体，他们之间有着太极拳专利的持续合作产出。(5)从国际专利分类代码的种类来看，国际太极拳专利涉及的功能领域较为广泛，从专利技术主题来看，专利研发主要集中在训练器械方面。(6)核心专利开发更加注重太极

拳的健身价值。在公司和学校的经济支持和科研保障下，太极拳核心专利得以更好的产出。

关键词：太极拳；专利技术；知识图谱；专利计量

Information visualization analysis of international Taijiquan patent technology field

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Abstract: Objective: On December 17, 2020, Chinese Taijiquan was included in the list of representative works of human intangible cultural heritage, and the internationalization of Chinese Taijiquan entered a new stage. By consulting the related literature of Taijiquan, it is found that there is no relevant patent analysis of Taijiquan. Patent is a kind of exclusive power protected by the legal system that highlights the vitality of innovation in this field. It contains technical, legal and economic information, and is a rare comprehensive information resource. The analysis of international Taijiquan related patents can obtain the latest development of international Taijiquan patents, and provide reference and reference for the output of my country's Taijiquan patent technology. At the same time, it provides a new perspective for the research on the status quo of Taijiquan's international dissemination and recognition, and provides a new idea for the better exploration, interpretation and innovation of Taijiquan culture, and even for the development of Taijiquan's industrialization. **Methods:** (1) The document data method: Searching in CNKI, using "Tai Chi" and "Sports Patent" as keywords (search time range: 2010-2021), with "TS=(tai chi OR) taichi OR tai ji OR taiji OR tai ji chuan OR taijichuan OR tai ji quan OR tajiquan OR tai chi quan OR taichiquan)" is the search condition for advanced search in the Derwent index database. In the library of Zhengzhou University and the library of Zhengzhou University Sports College, you can read books about Taijiquan, patent technology, and knowledge graph visualization, and check and browse related websites of Taijiquan, patent and knowledge graph visualization. After reading, sorting and summarizing the above-mentioned documents, 15 of them are directly cited as the theoretical support for the analysis of international Taijiquan patents. (2) Bibliometric and visual analysis method: This article uses Citespace (5.6.R2) visualization software to visually analyze international Taijiquan related patents, combining quantitative research with qualitative research.

Visually analyze the annual number of patents, the distribution of DMC patent technology fields and the hotspot evolution trend of international Taijiquan patents included in the Derwent database from 1963 to 2021, and provide a more intuitive and clear research and analysis of the development and future evolution of international Taijiquan patents trend. (3) Logic analysis method: Organizing, summarizing, and analyzing data and information related to international Taijiquan patents. **Results:** From the perspective of the time distribution of international Taijiquan patents, through the analysis of the annual publication volume of international Taijiquan patents, the annual number of international Taijiquan patent applications has shown a fluctuating growth trend.The spatial distribution of international Taijiquan patents is as follows: (1) From the perspective of the distribution of disciplines, the international Taijiquan patent technology covers a total of 18 disciplines from 1963 to 2021, mainly involving the fields of instrumentation, sports science, engineering design, and telecommunications technology. Computer science and other fields. Among them, Taijiquan patents involve the most in the field of equipment, with a total of 356. (2) From the perspective of the distribution of patentees, there were a total of 288 patentees for international Taijiquan patents from 1963 to 2021, and the top 19 patentees were all from China. Among them, 10 patents are for individual applications, 7 are for university applications, and 2 are for company applications. The patentees of international Taijiquan patents are mainly individuals and schools, and the output of Taijiquan patents that rely on companies is relatively small. (3) From the distribution of main inventors, 454 inventors participated in the international Taijiquan patents from 1963 to 2021. Compared with the number of patents of other sports, there are relatively few inventors involved in the research and development of Taijiquan in the world. However, an analysis of the top 20 inventors of international Taijiquan research found that these patented inventors are all from China. The analysis of the hot technical fields of international Taijiquan patents is as follows: (1) From the perspective of the IPC technology distribution of international Taijiquan patents, international Taijiquan patents involve a total of 228 technical fields, involving A human life needs, B operations; transportation, C chemistry; Metallurgy, F Mechanical Engineering; Lighting; Heating; Weapons; Blasting, G Physics, and H Electricity. Among them, Part A has the largest number of patents on human life needs, with a total of 140 patents, accounting for 61.40% of the total number of Taijiquan patents. IPC hotspot technical fields mainly belong to A63B (equipment for physical exercise, gymnastics, swimming, climbing

or fencing; balls; training equipment). (2) Judging from the distribution of international Taijiquan patent DMC, the technical fields with the highest frequency of international Taijiquan patent technology are sports training and fitness training, training equipment, and computer processing for sports and training equipment. The simultaneous appearance of multiple codes in a patent indicates that a patent can be applied to multiple technical fields. The main hot areas of Derwent manual code patent technology mainly focus on the equipment, equipment and clothing in Tai Chi exercise training. The patent direction is mainly Tai Chi fitness and teaching, but also involves the field of athletics and medical treatment. The distribution of core patents of international patent technology is as follows: (1) Judging from the distribution of the top 15 core patents cited by frequency, the core patents of international Taijiquan are mainly concentrated in China and the United States, and China has the most cited high-frequency documents. According to the analysis of patent themes, it is found that more patents are developed for fitness functions in Taijiquan, and there are fewer patent developments in sports. Except for related patents specifically designed for Taijiquan, most of the patents whose functions can be applied to the field of Taijiquan as well as other fields. (2) From the perspective of the distribution of the main patentees of core patents, the main patentees of core patents mostly belong to China and the United States. China has certain advantages in the research of core patents of Taijiquan. The patentees of core patents are mostly companies and colleges. **Conclusion:** (1)Although the applications for international Taijiquan patents have not formed a continuous upward trend year by year, they still show an overall increasing trend. (2) Taijiquan has its own limitations. Compared with other sports, patents involve fewer disciplines, but the patented technology of Taijiquan still has the characteristics of cross-integration of multidisciplinary research fields. In addition to the overall characteristics of Taijiquan related patents that are multidisciplinary, their single patents also involve multiple disciplines. (3) Compared with the most market-oriented and industrialized sports events such as basketball, tennis, badminton, etc., which are mostly owned by the company in the world, Tai Chi is still a sports event with a strong local color, with a degree of internationalization. While relatively low, the market conversion rate is low, and the patent utilization rate is low. (4) China has a large number of patented Taijiquan inventors and is the main force in Taijiquan patented inventions. Most of the invention patent outputs of the main patent inventors come from individuals or relying on schools, and some inventors have a common invention cooperation group,

and they have continuous cooperation outputs of Taijiquan patents. (5) From the perspective of the types of international patent classification codes, international Taijiquan patents cover a wide range of functional areas. From the perspective of patented technical topics, patent research and development are mainly focused on training equipment. (6) The development of core patents pays more attention to the fitness value of Tai Chi. With the financial support of the company and the school and the guarantee of scientific research, the core patents of Taijiquan can be produced better.

Key words: Taijiquan, Patent technology, Knowledge graph, Patent measurement