

Study on the Practical Evaluation Method of Medical Achievements

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Abstract: A useful innovation is the need of the society, the evaluation of scientific and technological achievements innovation should put its practical evaluation in an important position, which is the embodiment of in-depth research on the connotation of innovation. Taking medical achievements as an example, this paper analyzes their characteristics and evaluation indexes, expounds the contents, common forms and USES of medical achievements, and qualitatively analyzes the related evaluation indexes. In the end, the paper, patent, monograph, application, achievement award, etc., put forward the mathematical model of quantitative calculation, and elaborated the processing skills of achievement innovation and practical evaluation results. The practical evaluation of achievements can effectively guide the development of r&d personnel towards the direction of application and marketization, make the achievements practical and useful, and help enhance the scientific research personnel's ideology of transformation and promotion of achievements.

1. Introduction

Innovation is the driving force of scientific and technological development and the core value of scientific research [1]. Today, the concept of innovation is gradually gaining popularity and the results of innovation are continuously produced [2]. However, the exploration of the connotation of innovation is not enough in the evaluation of science and technology [3], and there are still deficiencies or gaps in the evaluation of the quality and usefulness of innovation [4]. Medicine is a special specialty serving human health, and the evaluation of medical achievements should be more strict, but there is no effective scientific evaluation method [5]. The current evaluation of innovation in scientific and technological achievements is mainly to review the duplication with historical achievements, such as the retrieval report of various information research institutes and libraries with novelty retrieval qualification [6]. The method is to search similar literatures and read them one by one, draw innovative conclusions through comparison, and explain the innovation of a certain achievement [7]. It is worth pondering whether science and technology, which has never appeared in history, has practical significance for human beings [8]. The purpose of promoting scientific and technological innovation is to promote the development of disciplines and social progress for the benefit of mankind. However, not all innovative technologies meet our expectations. For example, the research on human cloning, human-animal hybrid that violates human ethics and morals; For example, although some technologies are innovative, they are not needed by human beings, and the manufacturing cost is too high. Instead, they are not as good as the existing technologies. Therefore, it is necessary to put the practical evaluation of innovation in an important position.

2. characteristics analysis and evaluation index of medical achievements

2.1 main contents of medical achievements

The main content of medical achievement includes: invention patent related to medical device. Such as the improvement of common medical devices, the development of new assistive tools, and

the development of high-tech medical equipment. In addition, there are a lot of patents on new drug formulations. Research and development of high-tech medical devices is relatively rare.

The second is improved or new methods of diagnosis and treatment. Is the medical staff in the clinical practice process of new experience or new discovery. For example, the combined use of multiple drugs, integrated Chinese and western medicine treatment program, as well as new symptoms and development rules of newly discovered or existing diseases.

Third, new drug research and development and new uses of drugs. The former mostly belongs to the research and development of pharmaceutical companies, because the development of new drugs is very difficult, often not a common form of medical achievements. However, clinical studies of new drugs are mostly conducted in hospitals, so such results should be included in the analysis.

Fourth, basic medical theoretical achievements. The new situation that basically is in laboratory experiment observation, the new method that the experiment gives out. For example, new methods of culture cancer cells, new detection technology and so on.

Fifthly, other achievements related to human health, such as all kinds of health care auxiliary tools, health care products, such as all kinds of massage physiotherapy patents, health care products beneficial to health.

2.2 formal analysis of medical results

The common forms of medical achievements mainly include papers, patents, monographs and so on.

Paper is the most common form of achievement. For medicine, the main content of the paper includes: to verify the efficacy of drugs, treatment program clinical practice paper. The same drug or therapy will often have multiple authors and multiple papers, whose main significance is to verify and propose the experience of using. The second is to propose a new diagnosis and treatment program, basic theoretical research. The third is a short case report, which is mainly about the emergence of new diseases, new symptoms and other cases.

Patents are often designs that produce specific products. Including invention patent and utility model patent. Another part of the patent belongs to the new drug formula, also includes some health care tea formula.

Monographs, including teaching materials and supplementary books. This kind of book is more of a summary and update of the existing knowledge, and the innovative part may not be developed by the author, or the whole book is integrated with the research results of some authors. As a compilation of the results of the research group, the admission standard is relatively low, and the textbook to add new knowledge is strict. The amount of teaching materials, the scope of application is often larger.

2.3 analysis of main USES of medical achievements

Usefulness of papers: the practical evaluation of papers is mainly to evaluate the social or academic value, mainly from the level of papers published journals, journal impact factors, as well as paper cited frequency and so on. This is the social benefit or academic value that the paper can produce directly.

Patents, mainly evaluation of patent conversion. Such as whether to be purchased by the enterprise into production, into a saleable goods, annual sales revenue. In fact, the number of patents in China is large and the annual increase is large, but the number of patents actually used in production is very small. If the patent is not converted, its practicability can be evaluated through market survey, and the evaluation result is only expected.

Monograph, monograph's practical evaluation is more difficult. The circulation of monographs is usually far less than that of textbooks. Its practical evaluation can be carried out through circulation, media reports, being adopted as teaching materials and so on.

Diagnosis and treatment technology, mainly to see the use of the situation. Whether it is adopted by other medical institutions and applied to practical work. The adoption unit shall issue application certificate to the developer and provide actual application results as supporting materials. For

example, the number of specific diagnosis and treatment cases. The level of use of units also has a direct impact on practicality, the higher the level of use of units, the more widely used.

Achievement award or scientific and technological progress award is another important way to reflect the practical value of medical achievements. Winning a prize can bring the developer many benefits such as promotion, fame and bonus. However, this kind of award is mainly based on the certificate issued by the government department with the national emblem. The Ministry of Education statistics of science and technology in colleges and universities every year also only statistics have the national badge certificate third prize and above.

2.4 evaluation index classification and weight preset

The papers are divided into SCI and domestic core, SCI files including EI, CPCI and other internationally renowned retrieval articles, and domestic core papers include Chinese core journals, Chinese science and technology core journals, CSCD journals and so on. The number of citations should be removed.

Patent conversion according to production and sales efficiency, divided into ten million, one million, one hundred thousand. When the patent is not converted, the expert evaluation method is adopted to evaluate its market value by peer experts, which can be divided into excellent, medium and third grades. The monograph is determined according to the circulation of the monograph and the circulation of the reported media.

Application certificate is classified according to the hospital classification standard and government level. The award is also divided according to the level of the department and the level of the award.

Each of the above items is assigned a weight (W). Weight is assigned to each indicator according to the actual situation to distinguish the importance of different indicators.

See the following table for the classification of specific index grades and levels:

Table 1. Classification of grades and weights of different evaluation indicators

category	Grade	Weight	Grade	Weight
Paper	SCI (IF = n) [1]	W1	Cited frequency	
	Domestic core (IF=n) [2]		Divided by 10	
Patent	Conversion economic benefits	W2	Market value forecast	
	Don [1]		Master [1]	
	Millions of [2]		Medium [2]	
Monographs	Thousands of [3] [3]	W4	Third [3]	W3
	circulation		Media reports	
	Each copies		Each copies	
Application prove	Hospital grade	W6	The government adopt	W5
	Level 3 [1]		In the epicenter [1]	
	Level 2 [2]		Provincial [2]	
Achievement	Level 1 [3]	W7	The city level [3]	W7
	National [1]		The first prize in [1]	
	Provincial [2]		Second prize [2]	
	The city level [3]		Three such as [3]	

3. Construction of innovative practical evaluation model

On the basis of the above qualitative evaluation, this paper clarifies the relevant evaluation indexes of the practicability of innovation results, and differentiates the grades and grades of the indexes. As can be seen from table 1, the grade is inversely proportional to the score, that is, the higher the grade, the lower the score of this index. The greater the level of economic benefits, circulation, word count and so on, the more positive benefits there are. When the value and weight of relevant indicators are clear, relevant indicators tend to be quantifiable.

3.1 design of calculation formula in the paper

Set the weight as W, the influence factor as IF, the cited frequency as C, the score of this index as I, and n as the index grade, then:

$$I = \sum_{2 \leq \mu \leq 5} W \times \frac{IF}{\sqrt{\mu^{2n-1}}} \times \left(\frac{C}{10} + 1 \right)$$

3.2 general formula for patent and application proof

Let the corresponding integral of the index be I, the weight be W, and n be the index grade.

$$I = \sum W \times \frac{1}{\sqrt{\mu^{n-1}}}$$

3.3 calculation formula of monograph

If the integral is I, the weight is W, and the number of words is N thousand, then:

$$I = \sum W \times \sqrt{N}$$

3.4 calculation formula of achievement award

Set the integral as I, the weight as W, m as the department level awarded the achievement award, and n as the award level of the achievement award, then:

$$I = \sum W \times \frac{1}{\sqrt{\mu^{m-1}} \sqrt{\mu^{n-1}}}$$

A result may have a form, then calculate separately and add up. However, if it is a single result form, it is calculated separately.

4. Application demonstration

Three years have passed since the conclusion of a clinical research project, 5 scientific research papers have been produced, 2 utility model patents have been issued (not converted), and the third prize of municipal scientific and technological progress has been awarded once.

4.1 review of results

First of all, the authenticity and relevance of all the results were reviewed to exclude irrelevant and untrue results. After checking the results, it was found that there were two SCI articles in the paper, but one of them was only an abstract. The Chinese version of this article had been published in the core journals in China, and it was essentially an article published in two languages. Therefore, the actual paper of the research group is 3 domestic core journals and 1 SCI article. (2) a utility model patent and the subject has no relevance or relevance is not strong, so excluded. (3) in the application certificate, there is only a certificate for a third-level first-class hospital and two second-level hospitals, and there is no clinical use case and benefit data, so it is excluded. It is only recognized that this subject is applied by a third class a and second class hospital respectively. The results are shown in the following table:

Domestic core journals	SCI	Patent expected	achievement	Application prove
①IF=0.37,C=3	IF=3.7	The market value	Municipal third class	Level 3 [1]
②IF=1.2,C=5	C=11	Third class		Level 2 [2]
③IF=0.56,C=2				

4.2 comprehensive accounting

To facilitate the demonstration of the calculation process, we set the weight of the paper as 20 points, the weight of the patent as 20 points, the weight of the achievement award as 30 points, and the weight of the application proof as 30 points. Muon is 3.

Thesis calculation:

$$I = 20 \times \left[\frac{0.37}{\sqrt{3^4-1}} \times \left(\frac{3}{10} + 1 \right) + \frac{1.2}{\sqrt{3^4-1}} \times \left(\frac{5}{10} + 1 \right) + \frac{0.56}{\sqrt{3^4-1}} \times \left(\frac{2}{10} + 1 \right) + \frac{3.7}{\sqrt{3^2-1}} \times \left(\frac{11}{10} + 1 \right) \right] = 163.38$$

Calculation of patent:

$$I = 20 \times \frac{1}{\sqrt{3^3-1}} = 6.66$$

Calculation of achievement award:

$$I = 30 \times \frac{1}{\sqrt{3^3-1}\sqrt{3^3-1}} = 3.33$$

Calculation of application proof:

$$I = 30 \times \left(\frac{1}{\sqrt{3^1-1}} + \frac{1}{\sqrt{3^2-1}} \right) = 47.33$$

Above comprehensive score: 220.7

4.3 processing technology of calculation results

When taking fruit as the theoretical foundation research, we should take into account the influence of the paper and the achievement prize, and often score higher in these aspects. When the fruit is applied, its patents and applications tend to score higher. According to the usefulness of different results, important indicators can be given higher weight in the actual calculation, and the weight of secondary indicators can be reduced or ignored.

The most important way to use the result is to sort the same kind of practical integral.

The practical evaluation of achievements can effectively guide the development of r&d personnel towards the direction of application and marketization, make the achievements practical and useful, and help enhance the scientific research personnel's ideology of transformation and promotion of achievements.

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