

Research on patent portfolio design by Using of TRIZ Method

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Abstract: By integrating patent portfolio design ideas and TRIZ innovative approaches, a patent portfolio design model is proposed in this paper, which is based on the enterprise's core technology. Basing on this model, the TRIZ based portfolio design process is developed via matching the TRIZ innovative methods and the types of patent portfolio and constructing patent portfolios using homologous TRIZ innovative methods. Taking TRIZ as the basic theory and synthesizing innovative methodologies, patent jurisprudence, and management, interdisciplinary research of collaborative innovative design is conducted.

1. Introduction

Patent portfolio is strategic patent collection, which will consolidate the patent owner's patent competitive advantage through combination of patents that are obvious differences and closely related. Patent portfolio design is the innovative design behavior of resources allocation, technology excavation and patent portfolio, which is patent-portfolio formation oriented.

Portfolio design ideas originate from economic management field. In 1952, Ma Horowitz (Markowitz) [1] an American economist, firstly proposed the portfolio management theory. In early 1990s, Brockhof [2] introduced this theory to the field of corporate patent strategy in his pioneering patent portfolio model. Current researches on patent portfolio mostly focus on the area of management. Scot [3] provides a mechanism for patent portfolio analysis and decision-making to help companies effectively implement the developing strategy of the R & D patent and enhance

their research and development capabilities. In Ziedonis' research [4], companies' core technology was found by searching the scale and number of the best patent portfolios. Then the peripheral technology system around the core technology system was built to develop the patent portfolios in the field of core technology. Grindley [5] studied the combination of patent licensing and cross-licensing and hold the view that the patent portfolio model is helpful for the choice of internal and external R & D. Kang Yuhang [6] take the multi-scaling MDS as a patent portfolio analysis tool to demonstrates the combination relations between patent data item sets in the form of visualization for business analysis. In this paper, various problem solving and analyzing tools are applied in patent portfolio design processes, such as patent analysis, patent excavation, patent applications and ultimately the patent portfolio.

2. TRIZ Theory and patent portfolio design

2.1 Portfolio design model.

Patent portfolio design is an innovation design method based on patent portfolio guidance. Its types and graphical representation are as shown in Tab.1:

Table 1.The type of portfolio design model

Name of patent portfolio	Legend said
Cluster patent portfolio	
Parachute patent portfolio	
Galaxy type patent portfolio	
Chain patent portfolio	

Comprehensive above several kinds of portfolio design models, based on the core technologies in enterprises, this paper proposes a new patent portfolio design models, as shown in Fig.1.

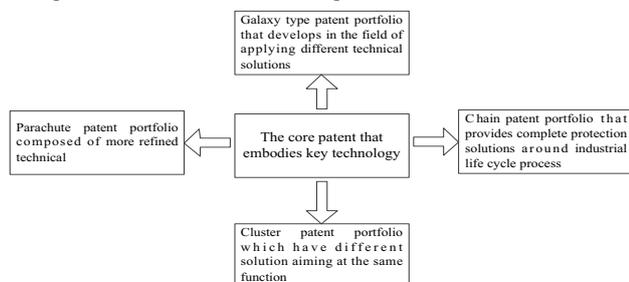


Fig.1 Patent portfolio design models based on the core technologies in enterprises

2.2 TRIZ-based patent portfolio design process.

Patent portfolio design process based on TRIZ theory consists of five steps, as shown in Fig.2.

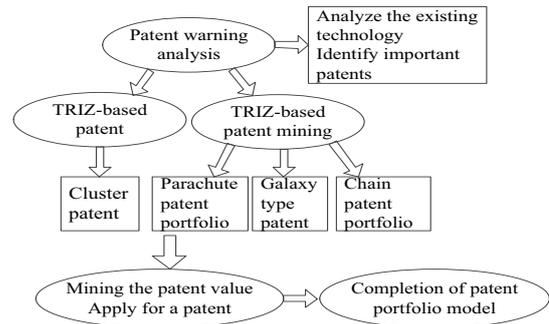


Figure 2: Portfolio design process based on TRIZ

2.2.1 Patents warning analysis.

Patent early warning analysis based on TRIZ theory mainly includes three parts content. First, functional analysis based on TRIZ is used for multi-dimensional technology decomposition in the target technology. Second, the target technology based on the decomposition is used to search for each function or function points. The third step is to build patent analysis tree based on the strategic integration of functional analysis and patent portfolios.

2.2.1.1 Target technology of multidimensional angle-resolved based on functional analysis.

Functional analysis is an important theoretical and analytical tool in TRIZ. The purpose of existence of product is its function. By establishing a functional model, the functional analysis of the product analyzes all of the functions which require implementing a function, until the analysis to the smallest functional unit that is the functional element. Taking the function can reveal function and meaning of functional components, parts or assembly unit into consideration, in function block diagram, it can also mark the role of the relationship between the components, create an object from the input to the output of the model of complete product structure graphical analysis. On this basis, function can classify, combine and decompose the

target technology so that it can achieve the multidimensional decomposition of the target technology.

2.2.1.2 Search for each function or function points based on the decomposition of the target technology.

Only a detailed analysis of target technique can ensure the comprehensiveness and accuracy of the data. A list of information on functional analysis of the target technology and the functions of each points or functional element covered by equivalent characteristics are to construct Boolean logic retrieval type, then retrieval the technical solutions which are related to technological problems of the functions of each points or functional element in the existing technology, read retrieved patent documents, identify the important patents and patent portfolio and establish technical efficiency corresponding figure as a form of subsequent design technical constraints.

2.2.1.3 The construction of patent analysis tree.

By retrieving the target technology, and identify the most relevant patents, that the important goal of patents, and then be expanded around the patent search, collect important patents that already exist in the prior technology combination from the four directions, build important patent parse tree, as shown in Fig.3, be important in the analysis tree Patent No. marked as inspired subsequent research and reference, to avoid infringement of the right combination of design, and the opportunity for each mining technology under patent portfolio.

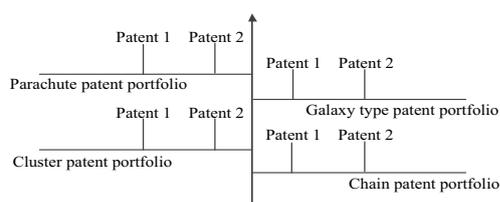


Fig.3 Patent tree

2.2.2 TRIZ -based patent circumvention design.

Patent circumvent design is to bypass the protection scope of the rights of a certain patent and realize innovative designs of same function. A variety of design schemes after patent circumvented can constitute a cluster-type patent portfolio of same function and different means of accomplishing. Patented circumvention design based on functional analysis method in TRIZ theory. A patent circumvention designing process using TRIZ theory is given as follows. First, each branch function or functional element in the functional model established by information analysis is to be analyzed; then functional elements of interest are to be selected; Second, standard engineering parameters and corresponding invention principles are to be abstracted. 39 standard engineering parameters are given by conflict resolution theory of TRIZ, then, corresponding invention principles can be found out according to the characteristic parameters and the deterioration parameters to be improved. The same functional elements can be re-solved by means of the tips of invention principles. Third, re-solve the analogically analyzed functional elements, by means of the patents retrieved from expanding areas through standard engineering parameters or patent cases corresponding to the invention principles suggested by innovative software, a number of innovative ideas can be produced to re-solving the same functional elements. Fourth, combine the functional elements according to patent infringement law, develop a non-infringing technical proposal, and then patent design is to be achieved.

2.2.3 Patented mining design based on TRIZ.

Using different methods in TRIZ, more patents can be excavated, and these will improve autologous competitiveness. And the design can be divided into the following situations.

2.2.3.1 Patent mining for parachute patent portfolio.

Patent mining facing to parachute patent portfolio improves existing core technology solution which mainly uses substance field model, conflict analysis and the invention principles in TRIZ theory, which includes following two application routes.

The first is substance -field analysis and its applications. On the basis of material field analysis of functional units, material field analysis is an important tool to analyze problems in TIRZ. The route uses all kinds of pre-set standard material field model to discover problems in existing function, then, take advantage of 76 standard solutions to excavate problem solution. The second is conflict analysis and application of the invention principles. On the basis of existing technology, core patents are done by conflict analysis, and technical and physics conflicts are found. These principles can be used to improve weakness in existing technology, and perfect solution is formed.

2.2.3.2 Patent mining for galaxy type patent portfolio.

Building galaxy type patent portfolio are mainly looking for expanding application of existing technology in other fields, this expansion includes three aspects.

One is that new product purpose in other areas, such as washing powder has been applied in the fattening farm fields, and it corresponds to apply for use patent. The second is products of integration innovative in other areas are developed. Thirdly, developed certain products which property reduces can satisfy the requirements of the special group. The invention of corresponding elements reduced may be applied. TRIZ methods which correspond to above three kinds of galaxy type patent portfolio, respectively are as follows. The first resource analysis method is using resource analysis to expand application fields, and is a method to screen and classify existing resource in TRIZ theory. Aiming at some universal patent innovation, it can screen all kinds of resource, and search for new fields of application. The

second method using hybrid integrated innovation method, expands technological opportunity with valuable technical point and integrating with other products, and is aimed at excavating new products. Disruptive innovation is aiming at the existing products with mainstream technologies by using cutting tool in TRIZ method.

2.2.3.3 Chain patent mining for the whole product life cycle.

From the implementation perspective of a particular technology or product industrialization, chain patent mining for the whole product life cycle develops and mining patents aiming at corresponding supporting and supporting technology in each link of core product, such as production equipment to packaging, marketing, transportation and even repair and recovery methods, etc. They can not only protect core technical solution powerfully, but also determine the competitive status of enterprise. This method can mining patent existing industrial chain cycle, according to law of demand evolution of TRIZ tools.

2.2.4 Evaluation the value of patents and patent applications.

Patent application as the one of the most important aspects of the innovation for the protection of intellectual property, is very important in the design of enterprise patent portfolio, the purpose of the patent portfolio design is obtained a wide scope of protection after an application for a patent for innovative solutions, assess the value of patents and patent applications involves two main steps: The first is based on the TRIZ innovation level of innovation to sort and classify, and give the corresponding intellectual property protection strategy; The second is to control patent analysis tree, feasibility evaluation of innovative solutions to avoid stepping on other people's patents mines and build their own patent portfolio.

3. Conclusions

TRIZ theory is an advanced method of auxiliary enterprise innovation, enterprise innovation achievements in the protection of the process, building a reasonable scope of protection of the patent portfolio let the enterprise the core technology and key technology of a relatively wider scope of protection, the protection of a relatively longer time in order to ensure the effectiveness of innovations. The innovative design in the beginning, to import the patent portfolio theory, can reduce the blindness of enterprise intellectual property protection, to prevent a single patent protection range and the emergence of unreasonable patent portfolio, to win intellectual competition.

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