

## Experience and Enlightenment of Foreign Research Crowdsourcing Platform Construction

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**Abstract:** The research crowdsourcing platform is the central link of scientific research crowdsourcing activities. Through the Internet, it links scientific and technological innovation resources with enterprises and scientific research institutions with innovative needs to solve scientific research problems. The foreign research and development package platform started earlier, the business types are richer, and the operating mechanism and management system are relatively mature. Learning from the successful experience of foreign research and development package platform will help solve the problems of small number of domestic research crowdsourcing platforms, low participation, and single platform crowdsourcing tasks, thus promoting the development of China's research and development crowdsourcing activities.

### 1. Introduction

Crowdsourcing package is a new way of contemporary scientific research activities. It gathers the wisdom of scientific researchers from all over the world through the Internet, carries out scientific research collaboratively, and jointly solves scientific research problems [1]. Crowdsourcing package platform is the central link of Crowdsourcing package activities. On the one hand, it connects enterprises and scientific research institutions with innovative needs. On the other hand, scientists, engineers and other professional and technical personnel will be gathered together to promote the completion of innovative tasks through their own businesses and services. The operation and management status of the Crowdsourcing package platform is related to whether the Crowdsourcing package activities can be carried out in an orderly and efficient manner. At present, China's Crowdsourcing package platform has a small number, low participation, and a single platform crowdsourcing task [2]. Studying the operation mode of the foreign Crowdsourcing package platform and summarizing its successful experience will help to provide reference for the construction of the domestic Crowdsourcing package platform and promote the development of the Crowdsourcing package activity.

### 2. Main business type

#### 2.1 Scientific experiment outsourcing

Science Exchange is the leader in this field. The main business of the platform is scientific experiment outsourcing and experimental equipment rental. At present, the platform has more than 2,500 service providers and can provide more than 6,000 services. The demander releases demand information on the platform, selects a partner after comparing online quotations of multiple service providers, and pays the service provider after successful cooperation.

#### 2.2 Technical search

NineSigma and yet2 both provide technical search services. This business is usually suitable for clearly defined technical problems. What customers need is to find specific solutions. NineSigma's business process is divided into four parts. The first step is to write a demand brief under the guidance of the platform consultant. Science Exchange is the leader in this field. The platform's main business is the second step of scientific experiment outsourcing and experimental

instrumentation. The profile is published in the corresponding section. At the same time, the platform database is searched for qualified technology or experts, and then the selected researchers are asked to request and seek them. Reply. In the third step, the proposal and introduction of the reply are given to the technical demand side for selection; the fourth step is to enable the demand side to complete the project cooperation with the selected partner. In addition to providing technical searches for specific topics, yet2 provides senior clients with strategic monthly reports on technology changes, market trend monitoring, and virtual innovation center services. rent.

### **2.3 Technical challenge**

InnoCentive is a leader in this field. InnoCentive breaks down the technical challenges into five types, namely creative challenges and theoretical challenges, according to the nature of the problem. To better solve technical problems, InnoCentive created the Team Project Room, allowing multiple challengers to form a team to meet the challenge. Technical challenges apply to more complex technical problems or problems that you want to get answers as quickly as possible. The demander publishes the problem description, reward for solving the problem, time limit, etc. The supplier submits the scheme as required, and the demander selects the satisfactory scheme and gives the bonus. Due to the relatively generous bonuses (for example, the average prize in the InnoCentive Challenge is about US\$ 20,000, and some even exceed US\$ 100,000), the published problems can attract wide attention and solutions can usually be obtained in a relatively short period of time. NineSigma's Grand Challenge and Kaggle's Competitions both belong to this type of business.

### **2.4 Technological market**

The technology market can be divided into technology demand business and technology supply business. The technical problems released in the technical requirements section are usually problems that do not specify a technical route but only require solutions. For example, the technical requirement that "a company seeks efficient and effective technology to disinfect powdered seasonings without affecting their performance characteristics" only requires an effective solution, and there are no too many restrictions on which method to adopt. Both NineSigma's Innovation Gallery and Technology Needs in the yet2 Marketplace belong to this business, and the above-mentioned "technical challenges" are essentially technical requirements. The technology supply sector is where technology owners transfer technology, and Technology in the yen2 Marketplace is such a sector. Yet2 is also subdivided into more than 20 sections of agriculture, geology, automation and aerospace according to the scope of technology application.

### **2.5 Open innovation management consulting**

There are almost all consulting services in each business of each platform. The open innovation management consulting business in the typical sense is open Innovation Portals of yet2. Yet2 customizes an open innovation portal and management system for customers, providing open innovation management consulting services from three aspects: providing software, related services and network management.

In addition to the above five main types of business, there are IdeaConnection's Idea Rally, ResearchGate and Kaggle's virtual community, yet2 and IdeaConnection's patent transactions and licenses.

## **3. The key to success**

### **3.1 Create a safe operating environment**

Information and financial security are the first concerns of customers when they participate in platform business. Therefore, the platform takes various measures to create a safe operating environment. First, improve the user certification system. At present, most of the more mature Crowdsourcing package platforms require individual and collective user authentication, [3] to reduce risk from the source. Second, multiple ways to strengthen security management. In the process of business operation, the platform mostly adopts security control management, signing

confidentiality agreements, white glove procurement and other technologies and management methods to improve security. Some leading platforms in the field of security management, such as Science Exchange, have also carried out SOC2 and ISO-27001 certification. Third, use legal means to avoid intellectual property risks. For example, InnoCentive not only confirms the identity of the winner through passports and the like after the challenge, but also signs relevant legal agreements with the winner and his employer to avoid intellectual property risks. Through these methods, customers' safety concerns are dispelled and they dare to participate in various businesses.

### **3.2 Effective management of innovative resources**

A large number of high-quality innovative resources are an important basis for attracting customers to participate in platform business and a prerequisite for the smooth development of platform businesses. Therefore, all platforms are actively seeking high-quality innovative resources. For example, most of the top 100 universities in the United States have scientific research institutions providing services in Science Exchange. The NineSigma platform brings together 2 million engineers and scientists from 105 countries around the world. InnoCentive has 390,000 "solvers" from 190 countries and regions around the world, and nearly 60% of them have master's degrees or above. At the same time, massive data also puts forward higher requirements for the data management of the platform. To make the platform run in an orderly manner, it is necessary to establish an effective technical system and management system according to its own resource status and business type.

### **3.3 Meet the needs of customers at multiple levels**

A good platform usually provides a range of services to meet the needs of customers at all levels and at different levels. For example, Science Exchange provides both experimental instrument rental and scientific experiment outsourcing services with more than 6,000 services. InnoCentive's five types of technical challenges. Yet2's technology search business provides technology search on specific topics, strategic monthly reports and virtual innovation center services. The rich product categories enable customers with different levels of demand to find the services they need.

### **3.4 Provide customers with high-quality services.**

Crowdsourcing package service is professional and difficult, requiring all parties to cooperate to have in-depth understanding of the project's connotation, evaluation criteria, cooperation procedures, etc. Therefore, all platforms strive to achieve the task with high-quality services. For example, in order to better match the supply side with the demand side, Science Exchange selects the most qualified suppliers for the project by professional doctors, masters and scientists. We have also established the ISO 9001 certified quality assurance plan and internal quality continuous monitoring system. In order to improve the efficiency of technical search, NineSigma uses professional consultants to write project profiles and provide the best search methods. InnoCentive is a "black box" created by doctoral-educated challenge experts to break down problems or needs and formulate them into challenge projects, allowing both parties to communicate better while retaining their supervision. Almost all yet2 businesses provide full consultation services. In IdeaConnection's idea rally, a host was set up to better promote the discussion platform, and a voting system was set up to rank ideas in order to get valuable ideas from many ideas. High-quality services not only meet the needs of customers, but also improve the profitability of the platforms, which is also an important reason why these platforms can be favored by venture capital.

### **3.5 Enhance customer value**

Excellent platforms actively carry out customer value management, and strive to explore ways to add value to customers based on business characteristics. For example, Science Exchange can provide multiple competitive quotations according to customers' needs, and can order immediately, thus reducing costs and saving time for customers. Yet2's technology search business considers both the feasibility of the technology and its commercial value. Its patent transaction business not only provides a trading platform, but also provides services such as target patent identification, patent

selection, monitoring market behavior, and making purchase suggestions. IdeaConnection's Idea Rally introduces the concept of peer review to increase the viability of creativity. Enhancing customer value helps the platform and customers build good customer relationships to achieve a win-win situation.

### **3.6 Increase the appeal of the platform**

In these Crowdsourcing package platforms, products and services are used to attract customers. At the same time, they also showcase safety and quality certification, net promoter scores, strong technology resources, and well-known partners. In addition, it also includes important successful cases, the proportion and number of successful projects, and a long history to enhance the attractiveness of the platform.

### **3.7 Step by step to expand business areas**

Due to the wide distribution of Crowdsourcing business disciplines and more and more abundant technical subdivision, the scientific research platform can only operate effectively if it has a fairly in-depth understanding and accumulation of theories and technologies in relevant fields. Therefore, a successful platform usually focuses on a certain field or starts from one or two fields (or businesses) and expands into new fields (or businesses) after maturity. For example, InnoCentive was founded primarily in the fields of biology and chemistry, and has since expanded into the fields of mathematics, physics, chemistry, life sciences, computer science, and engineering. Yet2 started its technology market business in 2000, began consulting services in 2002, opened an open innovation and technology transfer service in 2004, and launched a patent acquisition business in 2006. A robust business style helps to provide high quality service to our customers, while also helping to avoid risks such as capital chain breaks.

## **4. Inspiration**

### **4.1 Effective maintenance of the interests of all parties is the prerequisite for the normal operation of the platform**

The technology crowdsourcing platform faces many risks when conducting business, and these risks may damage the interests of one party. There are three main types of risks for technology demanders. One is intellectual property risk, that is, the works provided by technology suppliers infringe on the intellectual property rights of others. Second, the risk that it cannot be completed on time, that is, the risk that the technology provider cannot complete the task as agreed in some businesses. The third is the risk of information disclosure, that is, the risk that technology demanders may disclose trade secrets or technical secrets in the process of searching for technologies or cooperating with suppliers. The main risk faced by technology suppliers is the evasion behavior of technology demanders. That is, after the technical demanders have obtained solutions through scheme comparison, they will let their own people participate in the bidding in a different way or find various excuses to prevent the scheme from closing. Some scholars believe that the main reasons for the problems such as ticket evasion and piracy in some domestic Witkey websites are lax supervision of identity authentication and ineffective protection of intellectual property rights [4].

Effective protection of the interests of all parties requires Crowdsourcing package platform to take legal, technical and management measures to avoid risks faced by participants. First of all, all parties should be regulated by legal means. At present, China has promulgated a number of laws and regulations related to Internet transactions, such as "Electronic Commerce Law", "Electronic Signature Law" and "Administrative Measures for Electronic Authentication Service". In the "Intellectual Property Law", "Tort Liability Law", "Contract Law" and other laws and regulations, there are also relevant provisions on the protection of Internet intellectual property rights, the identification of responsibilities of e-commerce trading platforms and electronic contracts. When conducting business, the Crowdsourcing package platform must urge all parties to cooperate in

accordance with the requirements of laws and regulations, and at the same time do a good job of retaining evidence and, if necessary, through judicial procedures. Second, strengthen technical protection. The platform should take risks such as firewall, encryption technology, digital signature technology, and security monitoring technology. Again, strengthen risk management. First, strengthen the identity authentication of technology demanders and technology providers according to the nature of the business. The second is to establish an internal review system to search for programs submitted by technology suppliers and try to avoid intellectual property risks. The third is to continuously innovate working methods, such as “white gloves” procurement, core information hiding and other information security. Finally, attach importance to information security certification. Conditional platforms should strengthen information security certification, which helps to improve the information security management level of the platform. On the other hand, it helps to dispel customer concerns and better attract customers to participate in various businesses.

#### **4.2 High quality innovative resources are the foundation for a good platform**

The smooth development of various business of the technology crowdsourcing platform is inseparable from the support of high quality and innovative resources. High-quality innovation resources should meet the requirements of three aspects. First, the ability to innovate, that is, the ability to solve technical problems. Second, the higher level of participation, that is, the willingness and condition to participate in the relevant business of the platform. The third is integrity, that is, the act and motivation of no infringement and evasion of responsibility. Therefore, platform one is to verify the relevant information of experts. If there are too many experts, it is also necessary to identify which experts are verified and which are to be verified. The second is to learn from the practice of continuous quality monitoring in Science Exchange and establish a dynamic evaluation mechanism based on business cooperation. The third is to continuously expand the number of excellent experts in order to improve the success rate of the attractive business of the platform.

#### **4.3 Products and services are the core of the platform's good operation.**

The root cause for the existence and development of Crowdsourcing package platform lies in its ability to help technology demanders solve innovation problems. Therefore, according to their own resources and capabilities, they should first “dig deep” into one or a few areas and gradually expand after maturity. Efforts should be made to improve the success rate of the business, instead of seeking perfection and attacking in all directions. Secondly, enterprises should actively understand the main difficulties in innovation activities and the main doubts and worries in participating in Crowdsourcing package business, so as to provide products and services in a targeted manner. Some scholars believe that the main reason why technology crowdsourcing is in its infancy in China is that it does not know how to use this model, especially if it does not know how to combine Crowdsourcing package with its business process [5]. Finally, we should cultivate and attract customers with quality management and service. The Crowdsourcing package business is still in its infancy in China. What are the advantages and disadvantages, the risks, and how the platform can be solved or compensated by providing services. Customers have a process of understanding, accepting and then participating. The platform can only dispel customer concerns through its own management and services, and continuously expand its customer base.

#### **4.4 Professional management and operation team is the guarantee for the good operation of the platform**

The platform requires a variety of knowledge and skills to support efficient operation, the most important of which is technical expertise. The main performance is in three aspects: First, the platform must have a deep understanding of the innovation needs of technology demanders, in order to effectively carry out technical search, writing project briefs and so on. The second is to need the support of professional and technical knowledge when selecting and evaluating the submitted scheme. Third, professional knowledge is also needed in consulting business, patent licensing, creative discussion and other business activities. In addition, enterprise management knowledge, intellectual property knowledge and network security management knowledge are also needed.

Therefore, the platform should set up a professional management and operation team to improve the operating efficiency of the platform.

#### **4.5 The necessary marketing strategy is the “booster” of the platform's continuous development.**

Crowdsourcing package platform mainly relies on products and services to attract customers, but this business is new to most domestic enterprises. The necessary marketing means are of great significance to continuously expand the customer base and promote the continuous development of the platform. First of all, we should learn from foreign excellent platforms to provide products and services that customers need. In terms of product strategy, it is better to “be small and complete” than to “be large and complete” easily. Due to the fact that the Internet is beyond the geographical limit, Crowdsourcing package platform can rapidly increase the popularity of the industry and win more customers even if it makes influence in a small subdivision area. Therefore, in order to further broaden the business field, in terms of services, in view of the fact that the Crowdsourcing package is still new in China, there is also a stage of “consumer education”. Therefore, the platform should include necessary consulting services in various businesses, and even open innovation management consulting services for SMEs. Second, customer relationship management should be strengthened. In the process of business cooperation, appropriate value-added services should be added on the basis of meeting the basic needs of customers to enhance customer value and increase reputation. After the end of the business, you should return to the company in time to understand the customer's feelings and evaluation. This aspect helps the platform to improve working methods and improve the quality of work. On the other hand, it helps to increase customer loyalty. Finally, explore new marketing methods in conjunction with platform features. For example, you can learn from the practices of foreign Crowdsourcing package platforms, attract customers by showing their own strengths, success stories, and introducing consumer evaluations. You can also try to explore new marketing methods based on the characteristics of participants.

### **5. Conclusion**

In addition to the Crowdsourcing package platform to strengthen its own construction, the rise of China's Crowdsourcing package activities requires the improvement of the external environment. At present, China has issued the “internet plus” Intellectual Property Protection Work Plan “,various laws and regulations are being continuously improved, the construction of social credit system is under way, and the atmosphere of” mass entrepreneurship and innovation “is increasingly strong. I believe that with the joint efforts of the whole society, Crowdsourcing package will provide new strength for the realization of China's innovation-driven development strategy.

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