

# Research on the Optimization Strategy of Makerspace Operation Mechanism of the College and University in Zhejiang Province Based on the Perspective of Tacit Knowledge Transfer

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## ABSTRACT

Makerspace of the college and university is an important carrier to carry out the college students' entrepreneurial activities. To give full play to the role of the makerspace of the college and university in cultivating college students' innovative and entrepreneurial talents and incubating entrepreneurial projects, it is necessary to improve the transfer efficiency of tacit entrepreneurial knowledge in the makerspace of the college and university. Based on the knowledge diffusion theory, this paper discusses the problems existing in the operation mechanism of makerspace of the college and university in Zhejiang Province, mainly including: tacit knowledge transfer way is less; there is less communication inside and outside the makerspace; the integration of various elements of the makerspace is not smooth enough. Finally, aiming at these problems, this paper puts forward the operation mechanism optimization strategy of the makerspace of the college and university in Zhejiang Province based on the perspective of tacit knowledge transfer.

**Keywords:** tacit knowledge; knowledge transfer; makerspace; operation mechanism

## 1. INTRODUCTION

The makerspace of the university and college is an important carrier for cultivating college students' innovative talents. In recent years, the universities and the colleges in Zhejiang Province have established a large number of makerspaces of the college and university. By gathering various resources inside and outside the university, they have continuously improved the internal management system, improved the entrepreneurial innovation spirit of the college students, and incubated a large number of innovative and entrepreneurial projects. At present, the research on the operation mechanism of the university makerspace mainly focuses on the maker ecosystem, and focuses on the operation mode and existing problems of the entrepreneurial ecosystem of the university makerspace. Innovation and technological change depend on acquiring knowledge, many of which are tacit knowledge. The acquisition of tacit knowledge is particularly important for the organization development. However, because tacit knowledge has the

characteristics of non-coding, high personality and monopoly, it is more difficult to transfer tacit knowledge than explicit knowledge. Benjamin and Shepherd think that only explicit knowledge transfer in the process of education is not enough, in most cases should ensure the effective transfer of tacit knowledge [1]. This is because knowledge transfer is usually related to personal and collective experience and best practice in the educational process, which provides practical value for knowledge users [2]. Therefore, studying the problems existing in the operation mechanism of the makerspace of the college and university in Zhejiang Province from the perspective of tacit knowledge transfer helps to reveal the factors restricting the efficiency of tacit knowledge transfer in the makerspace of the college and university in Zhejiang Province, so as to find the specific path to improve the operation mechanism of the makerspace of the college and university in Zhejiang Province.

## 2. LITERATURE REVIEW

### 2.1 *The makerspace of the university*

Makerspace is not only a place to make products, but also a place where people gather to share resources and knowledge, work on the projects, establish the networks [3]. It provides a platform for creators to realize creativity, exchange, share resources and knowledge and provide a series of services for creators [4]. With the development of the Internet, China vigorously advocates grassroots entrepreneurship and supports innovative activities. In addition, the concept of innovation, openness and communication advocated by maker culture is consistent with the nature of education. Therefore, the establishment of makerspace on campus has become a trend. The makerspace in colleges and universities is the base of cultivating young people's innovative ability. It promotes college students to participate in innovation and entrepreneurship activities, provides students with a new learning environment [5], promotes students' production ability, and cultivates students' curiosity, creativity and urgency [6].

The makerspace in Chinese colleges and universities combines the national conditions of mass innovation and entrepreneurship in China, pays more attention to marketization and emphasizes the combination of innovation and entrepreneurship. It not only promotes innovation and creation, but also supports entrepreneurship and provides incubation services. However, there are differences between the makerspace of the college and university and off-campus makerspace outside the universities. For example, college makerspace is based on standard teaching, rather than emphasizing open exploration in makerspace [7]. Therefore, studying the unique operating mechanism of university makerspace will help to improve its operating performance.

### 2.2 *Tacit knowledge transfer*

Polanyi divided knowledge into tacit knowledge and explicit knowledge from the perspectives of the concept, transfer medium and formation process of knowledge, and the concept of tacit knowledge was publicly proposed by him for the first time [8]. Nonaka pointed out that tacit knowledge is highly personal, with distinct subjectivity [9]. Therefore, tacit knowledge needs to be more easily expressed in practice and more easily accepted in the process of knowledge demand. Liao believes that knowledge transfer is a systematic process for knowledge demanders to acquire, absorb, accumulate and update knowledge from knowledge owners [10]. Tacit knowledge is developed and transferred by doing and using [11]. The focus of acquiring tacit knowledge is action, and action is the focus of acquiring tacit knowledge, and the core around this focus is reflection

and interaction. Thus, there are three main processes associated with acquiring tacit knowledge: action, reflection, and interaction. In addition, the transfer of tacit knowledge also depends on the development of relationships between actors, including trust between actors, relationship level, etc. [12]. Therefore, tacit knowledge transfer can be better promoted only through intrinsic motivations such as socialization and friendship [13].

## 3. OPERATION MECHANISM PRESENT SITUATION BASED ON THE PERSPECTIVE OF TACIT KNOWLEDGE TRANSFER IN MAKERSPACE

### 3.1 *Development status of makerspace of university and college in Zhejiang Province*

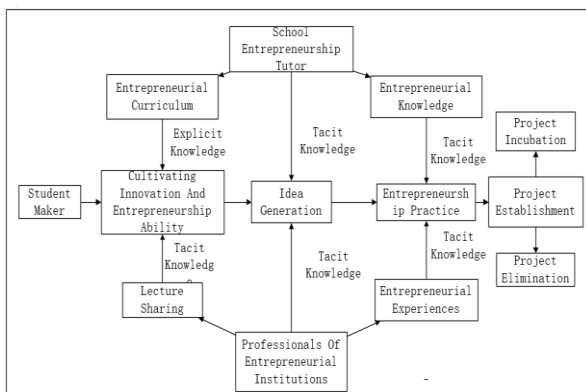
Most colleges and universities have established the makerspace with large scale differences in Zhejiang Province. Makerspace has become an important force among many makerspaces in Zhejiang Province. As an entrepreneurial service platform that can effectively meet the needs of college students' innovation and entrepreneurship with strong professional service ability, the makerspace in university and college in Zhejiang Province play an increasingly important role in improving the quality of innovative talents training, increasing employment quality of colleges and universities, and promoting the conversion rate of scientific research achievements in the colleges and universities.

### 3.2 *The Operation Mechanism of makerspace of university and college in Zhejiang Province*

The daily operation of the makerspace in universities and colleges mainly includes teaching the entrepreneurial courses, carrying out entrepreneurship simulation operations, participating in entrepreneurship competitions, and entrepreneurship project incubation. Makerspace mainly realizes the transfer of tacit entrepreneurial knowledge to makers through the continuous interaction between on-campus entrepreneurial mentors, makers, and managers of external related enterprises and institutions; and then through the entrepreneurial practice activities of the makers, promote makers to absorb and use tacit entrepreneurial knowledge.

Firstly, the on-campus entrepreneurship tutors teach entrepreneurship-related courses such as entrepreneurial management, business plan writing, and financial management to makers. Secondly, the makerspace will regularly invite executives of off-campus enterprises, heads of venture capital institutions, and managers of intellectual property institutions to give lectures in the makerspace to share implicit innovation and

entrepreneurship knowledge. Thirdly, makers stimulate creative ideas through interaction with entrepreneurial mentors and professionals from related entrepreneurial institutions, complete business plans, participate in various innovation and entrepreneurial competitions inside and outside the university, and continuously accumulate entrepreneurial experience. Fourthly, makers use the hardware, policies, start-up funds and other resources provided by the makerspace to practice creative ideas, constantly iterate and improve ideas, and carry out internal project incubation under the guidance of entrepreneurial mentors, and strive for the support of off-campus entrepreneurial institutions to achieve the final successful incubation of the project. Of course, some entrepreneurial projects cannot be realized due to various reasons.



**Figure 1:** Operating Mechanism of Makerspace in University and College in Zhejiang Province Based on Tacit Knowledge Transfer

#### 4. PROBLEMS IN THE OPERATING MECHANISM OF MAKERSPACE

##### 4.1 tacit knowledge transfer way is less

the lack of practicality of makers leads to less ways of entrepreneurial tacit knowledge transfer. The makerspace should carry out a series of entrepreneurial practice activities, so that the explicit knowledge of entrepreneurship learned by makers can be linked with entrepreneurial practice, and the tacit entrepreneurial knowledge can be increased through learning by doing. However, at present, makerspace mainly provides explicit entrepreneurship knowledge education, and few entrepreneurial practice activities are carried out. Makers lack the learning way of studying from practice, coupled with the limited entrepreneurial resources in the makerspace, cannot effectively stimulate the creativity of makers, hinder the improvement of the ability of innovation and entrepreneurship of the makers, and the absorption and utilization of tacit entrepreneurial knowledge is not sufficient.

##### 4.2 There is less communication inside and outside the makerspace

At present, the interaction of makerspace is mainly the interaction within the maker teams and the interaction between the makers and the entrepreneurial tutors in the university and college, but the interaction with the external entrepreneurial related institutions is less. This is very unfavorable for the transfer of tacit knowledge from makerspace to makers. Makerspace open collaboration level is low. At present, the operation of makerspace mainly relies on their own resources, and there are few connections with each other, lacking the effective cooperation and communication. The practical effect of cooperation between university makerspace and enterprises is not obvious, and the cooperation between universities and enterprises tends to be short-term and loose. Incubating projects in colleges and universities often do not match the needs of enterprises, which weakens the willingness to cooperate between the two.

##### 4.3 The integration of various elements of the makerspace is not smooth enough

At present, makerspace mainly provides a physical space for makers, and has not yet formed the whole process of resource allocation from idea generation to project generation to project incubation. Makerspace equipment is insufficient, so it is difficult to provide sufficient creative sharing space and DIY conditions for makers and to achieve the entrepreneurial environment of learning by doing. The financing channels of makerspace have not yet been established, resulting some entrepreneurial projects cannot get financial support, limiting the incubation of the project. Finally, the intellectual property protection method of makerspace is not perfect, and the government has not formulated detailed laws and regulations on the products and patent rights of makerspace.

#### 5. CONCLUSION

Makerspace of the college and university provides a platform for the development of innovation ability for makers. From the perspective of tacit knowledge transfer, this paper makes an analysis of the operation mechanism and existing problems of the makerspace of the college and university in Zhejiang Province. It is found that the maker space in colleges and universities lacks the way of tacit knowledge transfer, the internal and external links of makerspace are insufficient, and the utilization of innovative resources is insufficient. This is not conducive to the cultivation of innovative entrepreneurial ability. To solve the above problems, it is necessary to optimize the operation mechanism of makerspace, including: Broadening the path of tacit knowledge transfer, improving the incubation function of the makerspace, and increasing the integration of various elements inside and outside makerspace.

Firstly, makerspace should hold regular reports on successful makers and entrepreneurs, promote the interaction between them and makers in the informal learning environment, help makers to obtain entrepreneurial experience and stimulate creative ideas. to carry out makers' entrepreneurship competition, strengthen makers' understanding and learning of knowledge in the competition, to improve the ability of makers to apply entrepreneurial knowledge. Moreover, the establishment of online communication platform for makerspace not only promotes the communication and exchange between entrepreneurial tutors and makers, but also enhances the timeliness and convenience of communication, and enables makers to obtain an effective channel for tacit knowledge transfer.

Secondly, it is necessary to strengthen the links between various innovative organizations and make overall arrangements to promote the innovation cooperation of the innovative organizations. Therefore, to give full play to the role of each participant, universities, enterprises, governments and social media should perform their own duties to build a vibrant and sustainable university makerspace, and build it into a platform with an innovation and entrepreneurship practice platform for makers to create and share ideas. In addition, makerspace should also cooperate with nearby universities, research institutes, well-known enterprises, venture capital funds, and legal, financial, and consulting institutions to build a strategic alliance of makerspace.

Thirdly, makerspace should increase the support for the start-up capital of makers' projects. Furthermore, it is necessary to expand the financing channels of makerspace. In addition to government funding and corporate investment, makerspace should also incubate entrepreneurial projects and sell innovative products to achieve self-sufficiency in funds. Then, broaden the diversity of resources such as various types of professional and technical personnel, capital markets, and relevant entities in the industrial chain, so as to provide College students makers provide "whole process, one-stop" innovation and entrepreneurship services including project screening, team building, investment docking, and follow-up support.

Finally, further research should choose more makerspaces in university and college in Zhejiang Province for research, and combine quantitative questionnaire data analysis to test whether the analytical framework proposed in this paper is established and has universal significance. Moreover, the transfer efficiency of tacit knowledge in different stages of makerspace can be analyzed more specifically to reveal the transfer path and mechanism of the tacit entrepreneurial knowledge in the makerspaces in university and college in Zhejiang Province.

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