Research on Maker Space Risk of College Students Based on Perturbed Fuzzy Comprehensive Evaluation Method

Hong-Yin Fang[a], Xiao-Hui Chen[b],Jun-Yan Lan[c] ,Meng-Jia Ying[d], Zui-Yun Song[e],Xiao-Long Ma[f], Wei-Ning Tang[g] and Zhang-Guo Shen[h,*]

School of Business, Huzhou University, Huzhou, Zhejiang, China

[a]honeyfun0423@outlook.com, [b]huicx0318@tom.com, [c]loeyxixi1127@163.com, [d]18858650512@163.com, [e]562522838@qq.com, [f]lxm2007@sohu.com, [g]twnly@zjhu.edu.cn, [h]szgxx@hutc.zj.cn

*Corresponding author

Keywords: Disturbance fuzzy comprehensive evaluation method, College maker space, Risk assessment.

Abstract. College maker space can help college students realize low-cost, convenient, all-factor, open-ended innovation and entrepreneurship services. In this increasingly complex social business environment, college maker space has attracted the attention and research of many experts and scholars, but at the same time, there is still a significant gap in the study on the spatial risk factors of college maker space. In view of the above phenomena, this paper will study the spatial risk factors of college maker space, then analyze and optimize the spatial risk of college maker space by the perturbed fuzzy comprehensive evaluation method and seek the main elements of risk, thus providing a scientific basis for the strategy of avoiding the risk of college maker space.

Introduction

In March 2015, in the "Guidance on Developing Maker Space and promoting Public Innovation and Entrepreneurship," it was proposed to form some low-cost, facilitation, all-factors and open "maker space" by 2020. College maker space refers to the government's support policies, integrating social forces, utilizing the Internet and open source technology to provide a new low-cost, open and shared service platform for college students through specialized services and capitalization through a market-oriented mechanism. College maker space in China is not only an inevitable choice in the process of reforming and innovating education, but also an urgent need for the implementation of the current national innovation-driven development strategy.

According to the report of the National Science and Technology Conference in 2017, there are more than 4200 maker spaces, nearly 1000 listed enterprises have been nurtured and 1.8 million jobs have been created, including the blowout growth in the number of college maker space.

In this paper, the perturbation fuzzy comprehensive evaluation method is used to study the spatial risk of college maker space and the evasive measures are proposed for the prominent risks.

Review of Research

According to search CNKI, WANFANG, Weipu and some other domestic representative journals, conference and dissertation database, we found the research on college maker space mainly focuses on following aspects.

(1)Research on the construction path of college maker space. Research in this field mainly includes entrepreneurship education model, the transformation of innovation results, talent cultivation and so on. For instance, Liang Wei, in the article "Exploration of the Development Path of Local College Maker Space Construction," believes that the implementation path of local college maker space should be closely related to the four functions of university personnel training, scientific research, social service and cultural inheritance and innovation.

(2)Research on the development model of college maker space. The research in this field is mainly to consider colleges as the source of knowledge and then form a pleasant atmosphere of maker space. For instance, in the article" Research on the Function and Development Model of Maker Space," Ge Jing uses the laboratories of colleges and universities as an incubator of science and technology and through the support of high-tech talents to realize the innovation based on high-end technology.

(3)Research on the Functional education of college maker space. The research in this field mainly involves the cultivation function of mass innovation spirit, entrepreneurial network nesting and the heterogeneous synergy function of entrepreneurship. For instance, Zhang Yuguang, in the article "The Operation Mechanism and Construction Strategy of College Maker Space," considers that the college maker space should conform to the function of higher education development and the cultivation of innovative entrepreneurial talents and create a non-profit service platform and a test garden for talent training.

At present, most of the researches on the college maker space are a purely theoretical analysis of the modes, problems or countermeasures of the construction of college maker space. Although there are a certain amount of researches on the college maker space or fuzzy mathematics of colleges and universities related disturbances are based on disturbances. There are quite a few quantitative studies on the risk factors of college maker space in fuzzy mathematics. Therefore, this paper will start the quantitative analysis of disturbances from the following four risk factors.

The Construction of Risk Indicators for College Maker Space

College students have strong learning ability, active thinking and the courage to innovate, which is the driving force for the survival and growth of college maker space. College as the concentration of learning and research results, provide fertile soil for the development of maker space. With the support of the government, the unique features of the low-cost, facilitation, all-factors, open-type and other distinctive characteristics of college maker space are revealed. However, through the author’s access to a large number of periodical literature and related investigations, it is found that there are many risks and a low success rate in the construction of college maker space.

There are four aspects that may affect college maker space:

External Risks

The external risks of college maker space include policy risk, social resource risk, market risk and industry risk. At present, although in the external opportunity, the entrepreneurial policy grasp and the social responsibility source utilization of colleges have the short handle. College students’ social experience is insufficient to make a quick response to the market movement. The low sensitivity to the dynamic changes in the industry in which the results of learning and research are located. Therefore, the creation of college maker space in this process has produced many rigid and hardened institutional systems.

Operational Risk

The operation mode of college maker space is often too single, the source of financing channels is single and the ability to deal with financial problems in the process of operation is lack of exercise. In the process of technology implementation, there is not only lack of skilled operation ability, but also the deficiency of timely response and adjustment to the disaster demand. Therefore, in the process of college maker space, college organizers, managers and first-time entrepreneurs must reasonably grasp the scope of the maker space, improve project implementation effect of the project and coordinate the business operations risks.

Management Risk

The main bodies of the college maker space are students and teachers. The management consciousness of team leaders is reflected in whether the management consciousness of team leaders can respond in time when the team is in crisis, the flow of team members, how to make decisions in the face of disagreement and whether the managers themselves have strong control. Besides, college students lack social practice; the understanding of social is not deep enough. Although there is a passion for innovation and

entrepreneurship, for a company's daily operation management practice is less, the risks arising from the management process cannot be underestimated.

Marketing Risk

Due to the complexity, variability and uncertainty of the macro and micro environment, as well as the limited ability of entrepreneurs to recognize the environment, the incoordination between the marketing strategy and strategy formulated in the implementation of maker space and the development and charge of the market, as a result, all kinds of risks that will be borne. Thus marketing campaign will be blocked, failing or failing to meet the expected daily standard of marketing will flock to them. Therefore, college maker space must transform the achievements of academic research into tools for solving actual needs, the promotion plan and promotion channels for improving the results need to be considered.

Among the above risks, combined with the background of "double creation," the government, enterprises and colleges are encouraging innovation and entrepreneurship and the academic community is paying more and more attention to the risk factors of "Maker Space." Compared with theoretical research, the quantitative study of an empirical mathematical model is more persuasive and has higher academic value. Therefore, mathematical model quantitative analysis should also be introduced into the study of spatial risk of college maker space.

Improvement of Disturbance Fuzzy Comprehensive Evaluation

Construction of Spatial Risk Index System for College Maker Space

Based on the above risk analysis, the hierarchical diagram of the spatial risk assessment index system of college maker space is established, as shown in Figure 1:

Fig.1 Hierarchical structure diagram of spatial risk assessment index for college maker space

Disturbance Fuzzy Comprehensive Evaluation Method

The theory of fuzzy comprehensive evaluation was put forward by Professor Zade, an automatic control expert at the University of California, Berkeley, the United States. According to the membership degree theory of fuzzy mathematics, the qualitative evaluation is turned into the quantitative evaluation. Its results are relatively clear and have a strongly systematic. However, there are still some defects in practical application.

Firstly, using an accurate degree to measure whether an element belongs to a fuzzy subset and whether it can scientifically reflect the real situation of the evaluated object. Secondly, the M (V, A) model of the fuzzy comprehensive evaluation method is suitable for the operation between two fuzzy sets in the same domain by the method of "taking the big and take the small", but it is meaningless to "taking the big and take the small" between the two fuzzy sets which are not in the same domain.

Therefore, some scholars have improved the fuzzy comprehensive evaluation method—disturbance fuzzy comprehensive evaluation method. Let U be the domain. And for any $\mu \subset U$, specify an interval

$[U_A(\mu)-\varepsilon_A, U_A(\mu)+\varepsilon_A]$, where $U_A \pm \varepsilon_A \subset [0,1]$is a curve close to $U_A(\mu)$. Then A is defined as a perturbed fuzzy subset on a given domain U. Mapping $U \rightarrow [[0,1],[0,1]]$, $U \rightarrow [U_A(\mu)-\varepsilon_A, U_A(\mu)+\varepsilon_A]$, called the perturbation membership interval function of A, referred to as the membership interval.
Through the Analytic Hierarchy Process (AHP)[1], the weight of the influencing factors involved in the college maker space is set up to distinguish the importance of each factor. Then determine the degree of membership of the evaluation grade and establish the evaluation matrix of the fuzzy relation. The weight vectors of the fuzzy evaluation matrix and factors are normalized by the method of fuzzy mathematics operation to determine the comprehensive evaluation results. Finally, evaluating the overall risk level of college maker space.

Implementation of Comprehensive Fuzzy Evaluation Method for Risk Disturbance in College Maker Space

Evaluation Factors Set of Constructing College Maker Space's Risk

The evaluation factor set refers to the collection of various influencing factors involved in the evaluation object. By the analysis of the risk factors of college maker space in the previous article, the set of factors for evaluating college maker space is established as shown in Table 1 below:
According to Table 1, it can be concluded that the first-level risk factors of college maker space are set as follows: $U=(U_1,U_2,U_3,U_4)$, each primary factor consists of a set of secondary factors: $U_{ij}=(\mu_{i1},\mu_{i2},\mu_{i3},\mu_{ij})$, where " i " is the ordinal number of first-order factors and " j " is the ordinal number of second-order factors.

Table 1 List of factors for risk assessment of college maker space

The First Layer Indicators	The Second Layer Indicators
External risks U_1	Policy risk μ_{11} Social resource risk μ_{12} Industry risk μ_{13} Market risk μ_{14}
Operational risk U_2	Operational model risk μ_{21} Technology risk μ_{22} Financial risk μ_{23} Financing channel risk μ_{24}
Management risk U_3	Managerial risk μ_{31} Awareness risk μ_{32} Planning and decision-making risks μ_{33} Organizational and human resource risks μ_{34} The contradictory risk μ_{35}
Marketing risk U_4	Marketing plan risk μ_{41} Marketing channel risk μ_{42} Risk of achievement conversion μ_{43}

Determining the Evaluation Set of the Risk of College Maker Space

The evaluation set is a linguistic description of the evaluation indicators at each level. It is a collection of comments given by the reviewers on each indicator. In this article, the comments are divided into five levels. The specific evaluation level is: $v = (v_1, v_2, v_3, v_4, v_5)$ ={higher, high, medium, low, lower}.

Determining the Weight Set of the Risk of College Maker Space

Determining the weight of each risk factor is the key link of risk identification in the implementation of college maker space. The difference in weight of each factor reflects the difference in importance between factors. To determine the weight of each index scientifically, sending a questionnaire to experienced

[1]mainly through the nine-level scale method to establish the matrix to further obtain the main eigenvalues, eigenvectors, weight vectors, total sorting vector and quantify.

experts to assess the importance of risk factors affecting college maker space and then the statistical results are integrated to obtain the membership degree interval. As shown in table 2.
Set: the weight set for the first layer of indicators:

$$A=([a_1,a'_1],[a_2,a'_2],\ldots,[a_n,a'_n]) \quad (1)$$

the weight set for the second level of indicators:

$$A_i=([a_{i1},a'_{i1}],[a_{i2},a'_{i2}],\ldots,[a_{im},a'_{im}]) \quad (2)$$

Table 2 Weights of the space risks of college maker space

The First Layer Indicators	Weight coefficient	The Second Layer Indicators	Weight coefficient
External risks U_1	[0.15,0.21]	Policy risk μ_{11}	[0.15,0.25]
		Social resource risk μ_{12}	[0.30,0.35]
		Industry risk μ_{13}	[0.25,0.35]
		Market risk μ_{14}	[0.10,0.15]
Operational risk U_2	[0.21,0.27]	Operational model risk μ_{21}	[0.25,0.30]
		Technology risk μ_{22}	[0.35,0.45]
		Financial risk μ_{23}	[0.14,0.23]
		Financing channel risk μ_{24}	[0.20,0.30]
Management risk U_3	[0.30,0.36]	Managerial risk μ_{31}	[0.38,0.48]
		Awareness risk μ_{32}	[0.15,0.27]
		Planning and decision-making risks μ_{33}	[0.15,0.23]
		Organizational and human resource risks μ_{34}	[0.25,0.30]
		The contradictory risk μ_{35}	[0.18,0.25]
Marketing risk U_4	[0.13,0.19]	Marketing plan risk μ_{41}	[0.35,0.45]
		Marketing channel risk μ_{42}	[0.15,0.25]
		Risk of achievement conversion μ_{43}	[0.10,0.21]

Determining the Degree of Membership of the Risk of College Maker Space

According to the influence degree of various risk factors on the college maker space, 15 experts such as college maker space research experts, department leaders or experts outside the College and related to college mass innovation behavior are invited to form expert groups, which were scored and summarized separately through the nine-level scale method to form a summary table of risk factors influencing college maker space, as shown in Table 3.

Table 3 Comprehensive evaluation of college maker space

The First Layer Indicators	The Second Layer Indicators	Risk grade				
		High	Higher	Medium	Lower	low
U_1	μ_{11}	[0.05,0.10]	[0.25,0.30]	[0.50,0.60]	[0.15,0.25]	[0.00,0.05]
	μ_{12}	[0.40,0.50]	[0.30,0.35]	[0.10,0.18]	[0.05,0.10]	[0.01,0.05]
	μ_{13}	[0.01,0.05]	[0.40,0.50]	[0.30,0.38]	[0.10,0.20]	[0.05,0.10]
	μ_{14}	[0.05,0.10]	[0.14,0.19]	[0.45,0.55]	[0.18,0.25]	[0.10,0.12]
U_2	μ_{21}	[0.30,0.35]	[0.40,0.50]	[0.15,0.22]	[0.01,0.05]	[0.01,0.05]
	μ_{22}	[0.40,0.50]	[0.28,0.35]	[0.14,0.18]	[0.05,0.10]	[0.01,0.05]
	μ_{23}	[0.12,0.15]	[0.20,0.25]	[0.14,0.23]	[0.05,0.10]	[0.01,0.05]
	μ_{24}	[0.10,0.20]	[0.35,0.40]	[0.40,0.50]	[0.02,0.10]	[0.01,0.05]
U_3	μ_{31}	[0.45,0.50]	[0.32,0.35]	[0.10,0.18]	[0.05,0.10]	[0.01,0.05]
	μ_{32}	[0.08,0.13]	[0.24,0.30]	[0.35,0.40]	[0.20,0.25]	[0.05,0.10]
	μ_{33}	[0.10,0.15]	[0.15,0.20]	[0.20,0.30]	[0.32,0.40]	[0.05,0.10]
	μ_{34}	[0.30,0.35]	[0.35,0.40]	[0.15,0.20]	[0.10,0.15]	[0.01,0.05]
	μ_{35}	[0.15,0.25]	[0.30,0.35]	[0.38,0.43]	[0.05,0.10]	[0.01,0.05]
U_4	μ_{41}	[0.40,0.54]	[0.30,0.35]	[0.10,0.18]	[0.05,0.10]	[0.01,0.05]
	μ_{42}	[0.30,0.35]	[0.35,0.45]	[0.13,0.18]	[0.05,0.12]	[0.05,0.10]
	μ_{43}	[0.20,0.25]	[0.25,0.30]	[0.30,0.35]	[0.15,0.21]	[0.01,0.05]

From Table 3, the fuzzy relationship evaluation matrix R_{ij} of the spatial risk of college maker space is obtained. Such as external risk R_{11},

$$R_{11} = \begin{vmatrix} [0.05,0.10][0.25,0.30][0.50,0.60][0.15,0.25][0.00,0.05] \\ [0.40,0.50][0.30,0.35][0.10,0.18][0.05,0.10][0.01,0.05] \\ [0.01,0.05][0.40,0.50][0.30,0.38][0.10,0.20][0.05,0.10] \\ [0.05,0.10][0.14,0.19][0.45,0.55][0.18,0.25][0.10,0.12] \end{vmatrix} \tag{3}$$

Using the Comprehensive Evaluation Method of Disturbance Fuzzy to Determine the Comprehensive Evaluation Result of Risk

According to the comprehensive evaluation method of disturbance fuzzy, use the formula $B_i = A_i \circ R_i$, first, perform a comprehensive evaluation of the first-order disturbance fuzzy which is single factor judgment matrix R_i and its weight vector A_i get on synthetic vector operation $M(\otimes, \oplus)$. The result is the evaluation results of U_i. The calculation process of B_1 is as follows:

$$\begin{aligned} B_1 &= A_1 \circ R_1 \\ &= \left| [0.15,0.25][0.30,0.35][0.25,0.35][0.10,0.15] \circ \right. \\ &\quad \left| \begin{matrix} [0.05,0.10][0.25,0.30][0.50,0.60][0.15,0.25][0.00,0.05] \\ [0.40,0.50][0.30,0.35][0.10,0.18][0.05,0.10][0.01,0.05] \\ [0.01,0.05][0.40,0.50][0.30,0.38][0.10,0.20][0.05,0.10] \\ [0.05,0.10][0.14,0.19][0.45,0.55][0.18,0.25][0.10,0.12] \end{matrix} \right| \\ &= ([0.30,0.35],[0.30,0.35],[0.25,0.30],[0.15,0.25],[0.10,0.12]) \end{aligned} \tag{4}$$

The same reason:

$$B_2 = A_2 \circ R_2 = ([0.35,0.40],[0.30,0.35],[0.23,0.30],[0.05,0.10],[0.01,0.10]) \tag{5}$$

$$B_3 = A_3 \circ R_3 = ([0.38,0.45],[0.32,0.35],[0.20,0.25],[0.15,0.23],[0.05,0.10]) \tag{6}$$

$$B_4 = A_4 \circ R_4 = ([0.35,0.40],[0.30,0.35],[0.18,0.21],[0.12,0.15],[0.05,0.10]) \tag{7}$$

Then, based on the results of the first-level disturbance fuzzy comprehensive evaluation, the single-factor judgment matrix of the second-order disturbance fuzzy comprehensive evaluation is constructed R.

$$R = \begin{vmatrix} [0.30,0.35][0.30,0.35][0.25,0.30][0.15,0.25][0.10,0.12] \\ [0.35,0.40][0.30,0.35][0.23,0.30][0.05,0.10][0.01,0.10] \\ [0.38,0.45][0.32,0.35][0.20,0.25][0.15,0.23][0.05,0.10] \\ [0.35,0.40][0.30,0.35][0.18,0.21][0.12,0.15][0.05,0.10] \end{vmatrix} \tag{8}$$

therefore,

$$\begin{aligned} B &= A \circ R \\ &= \left| [0.15,0.21][0.21,0.27][0.30,0.36][0.13,0.19] \circ \right. \\ &\quad \left| \begin{matrix} [0.30,0.35][0.30,0.35][0.25,0.30][0.15,0.25][0.10,0.12] \\ [0.35,0.40][0.30,0.35][0.23,0.30][0.05,0.10][0.01,0.10] \\ [0.38,0.45][0.32,0.35][0.20,0.25][0.15,0.23][0.05,0.10] \\ [0.35,0.40][0.30,0.35][0.18,0.21][0.12,0.15][0.05,0.10] \end{matrix} \right| \\ &= ([0.30,0.36],[0.30,0.32],[0.23,0.25],[0.21,0.23],[0.10,0.12]) \end{aligned} \tag{9}$$

Then averaging each interval of vector B:

$$\overline{B} = (0.33, 0.31, 0.24, 0.22, 0.11) \tag{10}$$

Because 0.33+0.31+0.24+0.22+0.11=1.21>1,
Therefore, normalization is needed, so get:

$$\overline{B} = (0.273, 0.256, 0.198, 0.182, 0.091). \tag{11}$$

According to the Results of Calculation and Analysis, Determine the Risk Level of College Maker Space

According to the principle of maximum membership degree, the risk level of college maker space is "high." Therefore, colleges need to adopt scientific prevention to minimize risks in the process of implementing college maker space. Based on the principle of fuzzy distribution, the above calculation results show that among the risk factors of affecting college maker space, the management risk rank is the highest, followed by the external risk and operational risk and the marketing risk is the lowest.
Applying the theory of perturbation fuzzy mathematics comprehensive evaluation to evaluate the risk in the process of implementing the college maker space, scientifically determine the risk assessment indicators involved in the college maker space through the analytic hierarchy process and give different weights according to the relevant factors given by the expert evaluation team. It makes the spatial risk analysis of colleges more comprehensive, objective, fair and scientific to provide risk analysis for colleges and then reduces the impact of risk factors in the implementation process of colleges in the process of judging the results. Finally, judging the indicators that need to be improved and promoted to improve the success rate of the implementation of college maker space.

Strategies for Reducing the Risk of College Maker Space

According to the empirical analysis of the college maker space in the social environment, among the factors influencing the risk of creating college maker space, the main factors affecting the risk of college maker space are the external, operational and management risks. This paper proposes the following four points to reduce the risk in the development process of college maker space.

(1)Strengthen the construction of entrepreneurial teams and improve the team management mechanism. Since the current college student entrepreneurial teams often come from different directions, it is necessary for the maker space managers to pay attention to the complementarity of the knowledge structure and professional expertise of their own entrepreneurial team. Therefore, an excellent college entrepreneurial team must establish a sound team management mechanism for division of labor, coordination and task assignment and form a clear division of labor and close cooperation between team members. They have a common ideal pursuit and different areas of expertise. Learn from each other and complement each other.

(2)Implement various policies and policies and cooperate in multi-party cooperation. Since the construction of college maker space is often formed by the joint action of the government, the market, universities and students, there is no strong support in all aspects and the risk avoidance is not guaranteed. Therefore, when promoting the implementation of the college students' entrepreneurial leadership program, on the one hand, encouraging colleges and universities to develop innovative entrepreneurship courses, establishing and improve specialized institutions for college students' entrepreneurial guidance services and strengthening college students' entrepreneurship training. On the other hand, integrate the development of national and provincial college graduate employment and entrepreneurship funds. Let college students fully understand the support of government policies for themselves and then get better development.

(3)Carry out the quality education of makers and create an atmosphere of innovation and entrepreneurship. College students are the mainstream of today's social entrepreneurship, but students' innovative spirit and innovative ability are not intrinsic and their awareness of risk control is also very weak. Therefore, in the process of building a college maker space, it is necessary to make rational use of the resources and advantages of colleges and universities to enlighten and cultivate students' innovative

entrepreneurship and ability. Under the guidance of government policies, we will seize opportunities, improve our own quality, prepare for risk awareness and be the leader in mass entrepreneurship and innovation in the socialist market economy.

(4)Plan the overall marketing strategy to meet market development needs. Market demand is the foundation of entrepreneurship. If you do not comply with market rules, blind investment in entrepreneurship will create great risks. Therefore, in the initial stage of the venture, we must conduct a sound research on the market, determine the institutional mechanism according to the novelty of the market demand, the future expectation, the difficulty of the realization, priority and gradually improve the development process of the college maker space in a gradual manner so as to achieve overall planning, distributed implementation and sustainable development.

As for the solution, on this basis, we choose the road that meets the development of college maker space and build a complete set of space integration and systemization mechanism of maker space with the emerging development and operation mode. Because the current college maker space is in a high-speed growth stage, the complexity and marketability of the operation of university platforms have made all aspects of the management of universities and social institutions related, generating more new demands, thus promoting the development of college maker space' breadth and depth.

Acknowledgement

This work is supported by the National College Student Innovation Training Program.(project number:201810347013, project name:(Research on Influencing Factors of Acceptance Behavior of Mobile Groupware Perception Application Based on UTAUT Model and Extended TTF), and supported by the National College Student Innovation Training Program.(project number: 201810347021,project name: intelligent Wrong Questionbook App), and this work was funded by the Zhejiang Natural Science Foundation(project NO. Y18G030049), and supported by the General Project of Rural Development Research of Huzhou University (Project No. 2017XJXM53).

References

[1] Udell, Gerald G. Are Business Incubators Really Creating New Jobs by Creating New Businesses and New Products.The Journal of Product Innovation Management; Hoboken7.2 (Jun 1990):108.

[2] Hira, A, Joslyn, C.H., Hynes, M. M. Classroom maker spaces: Identifying the opportunities and challenges[A]. Frontiers in Education Conference (FIE)[C]. 2014.

[3] Sheridan,K.M., Havlverson, E.R.,Litts, B.K., Brahams,L., acobsparibe, L.&Owens,T. Learning in the Making: A comparative case study of three maker spaces[J]. Educational Review, 2014, 4(84): 505-565.

[4] Craig R. Forest&Roxanne A. Moore. The Invention Studio: A Univer-sity Maker Space and Culture[J]. Advances in Engineering Education, 2014.

[5] Carlson,S. The "Maker Movement"goes to college[J].Chronicle of Higher Education, 2015, 32(61): A26-A28.

[6] Volker, Lauren Mitchell, Incubator Spaces, New York28.3(Mar 2016): 16.

[7] Bergek, Anna; Norrman, Charlotte. ncubator best practice: A framework Technovation; Amsterdam28.1/2(Jan/Feb 2008): 20.

[8] Totterman, Henrik; Sten, Jan. Start-ups: Business Incubation and Social Capital. International Small Business Journal; London23.5 (Oct 1, 2005): 487-511.

[9] Peters, Lois; Rice, Mark; Sundararajan, Malavika. The Role of Incubators in the Entrepreneurial Process.Journal of Technology Transfer; Indianapolis29.1(Jan 2004): 83-91.