

Research on the Impact of Innovation Atmosphere of Maker Space on the Bootlegging Innovation Behavior of Makers

Huibin Guo, Xiaoming Huo^{a,*}, Yizhen Li

School of Business Administration, Hebei University of Economics and Business, Shijiazhuang, Hebei, China

^a1609312947@qq.com

*Corresponding author

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Abstract: In the context of socialism with Chinese characteristics entering a new era, makers have become an important innovation strategic talent pool in China, promoting the continuous incubation and iterative upgrading of innovation achievements. Based on social cognitive theory and organizational support theory, the empirical study of 422 makers found that the innovation atmosphere of maker space can significantly and positively affect the bootlegging innovation behavior of makers. Makers' innovation self-efficacy plays a part of intermediary role between the innovation atmosphere of maker space and the bootlegging innovation behavior. Innovation resources play a negative regulating role between the innovation atmosphere of maker space and innovation self-efficacy. This paper takes China's maker groups as research samples, and provides data based on the context of Chinese enterprises for research on maker space and bootlegging innovation. It can also provide management guidance for incubating more real enterprises in China's maker space.

1. Introduction

The term “maker” originated in the United States. At that time, it meant “a group that can use some simple tools in the basement or garage to design small works with their own ideas”. After being introduced into China, it can be seen that makers in China refer to innovation oriented entrepreneurs^[1]. Whether professional makers or amateurs, they can convert their ideas into commercial products by entering the maker space and through resource complementation, information sharing and thought collision. In recent years, the research of makers in China has mainly focused on maker space^[2], maker education^[3] and maker sports^[4]. Under the framework of “context-perception-behavior”, there is less research on the innovation behavior of makers induced by environmental atmosphere perception.

Many individual makers with new ideas converge into a huge group of makers. In recent years, more and more makers have settled in the maker space, and some studies have shown that, based on the innovation atmosphere of the maker space, makers will have more and more innovation behaviors. When the innovation resources provided by the maker space are limited, driven by the innovation self-efficacy, more and more makers will take an informal, covert and bootlegging innovation behavior. More and more scholars at home and abroad attach importance to “bootlegging innovation” because of its “rationality of purpose” and “deviation of behavior”^[5]. Therefore, the purpose of this paper is to study the impact mechanism of the innovation atmosphere of the maker space on the makers' bootlegging innovation behavior, enrich the theoretical research on the perception of the innovation atmosphere of the maker space and bootlegging innovation behavior in China, and provide guidance and practice for Chinese local enterprises.

2. Theory and Hypothesis

2.1. Innovation Atmosphere of Maker Space and Bootlegging Innovation Behavior

From the perspective of perception, Amabile et al. (1996) not only first defined the organizational innovation atmosphere, but also first believed that the organizational innovation atmosphere will have an important impact on employees' work attitude, ability, behavior and performance^[6]. Subsequently, Aaron and Sommerfeld (2012) concluded that the organizational innovation atmosphere plays a decisive role in the success or failure of individual innovation behavior^[7].

On this basis, some scholars began to pay attention to the relationship between the maker space, a special community/group organization, and individual innovation behavior^[2]. Ruan et al. (2018) found through their research on the maker space built by Jiangxi University of Finance and Economics that the maker space in universities can give full play to the advantages of students' resources, and create an atmosphere that encourages students to innovate by holding a variety of innovation practice activities, so as to improve the enthusiasm for innovation and even produce some innovation incubation results^[8]. Huang et al. (2021) concluded that the innovation atmosphere of maker spaces can indeed have an impact on makers' innovation behavior^[2]. However, the empirical research on the innovation atmosphere of maker space can significantly and positively affect bootlegging innovation behavior is less in China, lacking effective theoretical support. But Globinik and Salomo (2015) logically reasoned that there may be a positive correlation between the innovation atmosphere of the maker space and bootlegging innovation behavior^[9].

Hypothesis 1. The innovation atmosphere of maker space is positively influencing the bootlegging innovation behavior of makers.

2.2. Mediating Effect of Innovation Self-Efficacy

Bandura (1977) first proposed the theory of self-efficacy^[10]. Then Tierney and Farmer (2002) first applied the self-efficacy to the field of innovation research^[11], and combined relevant research with the creativity structure model to obtain a creative result, namely "innovative self-efficacy". Since then, Ma et al. (2017) have proposed a definition of innovative self-efficacy that is applicable to Chinese enterprises^[12], that is, employees' belief in innovative work.

A large number of studies have found that the innovation atmosphere is significantly related to the innovation self-efficacy. Zhou et al. (2017) divided the organizational innovation atmosphere into four dimensions, and through the research on these four dimensions, they found that organizational members can perceive and experience innovation atmosphere, and then produce a psychological cognition and measurement of innovation atmosphere which is innovation self-efficacy, so as to encourage members to continue to take innovation behaviors^[13]. Chen (2021) also pointed out that the innovation atmosphere of an organization can positively affect the innovation ability of employees, which is realized through employee perception^[14]. That is, the higher the innovation atmosphere of the organization, the stronger the appeal of employees, the stronger the innovation belief of employees, and the higher the innovation ability. This innovation atmosphere can constantly infecting and encouraging employees, and enhancing employees' innovation ideas which is innovation self-efficacy. As a special community/group organization, the innovation atmosphere of maker space will also have an impact on individual innovation self-efficacy, and the enhancement of makers' self-efficacy will also affect their innovation behavior.

Hypothesis 2. The innovation atmosphere of maker space is positively influencing the makers' innovation self-efficacy.

Hypothesis 3. Makers' innovation self-efficacy positively affects the bootlegging innovation behavior.

Hypothesis 4. Innovation self-efficacy plays a mediating role between the innovation atmosphere of maker space and the bootlegging innovation behavior.

2.3. Regulation Effect of Innovation Resources

Innovation resources in China refer to the resources owned by an enterprise that can directly provide new opportunities for employees' innovation, or reduce innovation risks and costs^[15]. Structural tension of innovation resources means that the resources provided by the organization for innovation activities are insufficient to support the effective implementation of innovation projects^[16].

At present, some scholars have studied innovation resources as regulatory variables. For example, through empirical research and analysis, Song (2017) concluded that both types of innovation resources are related to innovation behavior, and they can regulate the role of the other party in innovation as a regulatory effect^[15]. Based on the theory of regulatory focus, Zhao et al. (2019) believed that structural tension of innovation resources played a regulatory role between leaders' regulatory focus behavior and bootlegging innovation behavior^[16]. Charalampos (2010) believed that when the organization provides an innovation atmosphere, but the overall allocation of innovation resources is limited^[17], when the employees are eager to realize their own innovation ideas, they are more likely to implement bootlegging innovation. As a platform to provide resources, technology and information support for makers^[18], maker space can also provide an atmosphere. When the makers internalize the development goal of innovation, the impact of the innovation atmosphere of maker space on the bootlegging innovation behavior is regulated by the variable of innovation resources.

Hypothesis 5. Innovation resources play a negative role in regulating the impact of the innovation atmosphere of maker space on makers' self-efficacy.

3. Research Objects and Procedures

In this study, a questionnaire survey was conducted to investigate makers from Jiangsu, Sichuan, Hebei, Shandong and other provinces who settled in the maker space. A total of 422 valid questionnaires were collected. This survey does not distinguish between industries. Among them, 47.2% of the samples were male, female accounted for 52.8%. In terms of age, makers aged 25-34 accounting for 66.8%, makers aged 35-44 accounting for 25.4%, makers aged 45 and above accounting for 6.2%, makers aged 24 and under accounting for 1.7%. In terms of education level, undergraduate and graduate students ranked first, accounting for 68.0% and 20.6% of the sample respectively, junior college students and below accounted for 8.3%, doctoral students and above account for 3.1%. From the perspective of working years, 9.0% of them have worked for 2 years or less, participation in work for 2-5 years accounts for 51.9%, 24.6% of them have worked for 5-10 years, 14.5% of the samples have worked for 10 years or more. In terms of positions, ordinary employees accounted for 19.7%, grass roots managers accounting for 47.2%, middle managers accounting for 28.9%, and senior managers accounted for 4.3%.

4. Data Analysis and Results

4.1. Reliability Analysis

This research mainly uses SPSS24.0 to analyze the reliability of the four scales. The variable measurement scales used in this study are scales with high maturity at home and abroad, with high reliability and validity. The analysis found that the Cronbach's α coefficients of innovation atmosphere, bootlegging innovation behavior, innovation self-efficacy and innovation resources were 0.787, 0.852, 0.848 and 0.817 respectively. In addition, the reliability coefficient of each variable after deleting items will not be higher than the above results, so each variable will not delete items. The reliability coefficients of the four scales are all greater than 0.7, indicating that the scale has good reliability.

4.2. Model Validation

This paper uses hierarchical regression analysis to test the hypothesis of the model. First, the

innovation atmosphere of the maker space is taken as the independent variable, and the bootlegging innovation behavior is taken as the dependent variable. According to model 4 in Table 1, F statistic is very significant ($F=137.279$, $p<0.001$). Model 4 passed the ANOVA test, indicating that there is a linear relationship between the innovation atmosphere of maker space and bootlegging innovation behavior ($\beta=0.759$, $p<0.001$), and the hypothesis 1 is verified.

It can be seen from the regression model 1 that the F statistic is very significant ($F=196.241$, $p<0.001$). The results show that there is a linear relationship between the innovation atmosphere of the maker space and the makers' innovation self-efficacy ($\beta=0.845$, $p<0.001$), and the hypothesis 2 is verified. Then, in model 5, F statistic is also very significant ($F=142.009$, $p<0.001$), which passed the ANOVA test, indicating that there is a linear correlation between makers' innovation self-efficacy and bootlegging innovation behavior ($\beta=0.758$, $p<0.001$), hypothesis 3 is verified. Then, the innovation atmosphere of the maker space, innovation self-efficacy and bootlegging innovation are included in Model 6. The results showed that the F statistic was very significant ($F=150.051$, $p<0.001$), passed the ANOVA test, and the variance expansion factors were all less than 5, indicating that the collinearity between the variables was not serious. There is a significant positive correlation between the two and bootlegging innovation behavior ($\beta=0.398$, $p<0.001$; $\beta=0.427$, $p<0.001$), and the innovation atmosphere coefficient of the maker space has decreased from 0.759 to 0.398, but it is still very significant, which indicates that the innovation self-efficacy of makers plays a part of the mediating role in the mechanism. The hypothesis 4 is verified.

According to model 2, the innovation atmosphere of the maker space and innovation resources have a significant positive impact on innovation self-efficacy ($\beta=0.511$, $p<0.001$; $\beta=0.442$, $p<0.001$), and then three variables were jointly included in the model 3. The results showed that the impact of the innovation atmosphere of maker space on the innovation self-efficacy was weakened (β from 0.511 to 0.489, $p<0.001$), but still very significant. The de average innovation atmosphere * innovation resources are also significant ($\beta=-0.056$, $p<0.05$), indicating that innovation resources play a negative role in regulating the innovation atmosphere of maker space and innovation self-efficacy. Hypothesis 5 is verified.

Table 1 Hierarchical regression results.

		innovation self-efficacy			bootlegging innovation		
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
constant		0.741***	0.320*	0.632**	0.666***	0.525**	0.349*
innovation atmosphere		0.845***	0.511***	0.489***	0.759***		0.398***
innovation self-efficacy						0.758***	0.427***
innovation resources			0.442***	0.392***			
innovation atmosphere * innovation resources				-0.056*			
control variable	Gender	-0.069	-0.049	-0.050	-0.005	0.043	0.024
	Age	0.018	0.027	0.031	-0.015	-0.029	-0.023
	Education	-0.060	-0.053	-0.053	-0.002	0.012	0.023
	Work Year	0.083**	0.063**	0.068**	0.089**	0.051	0.054*
	Position	-0.037	-0.060*	-0.069**	0.030	0.081**	0.046
R ²		0.739	0.796	0.798	0.665	0.672	0.717
ΔR^2		0.736	0.792	0.794	0.660	0.668	0.713
F		196.241***	230.524***	204.107***	137.279***	142.009***	150.051***

Note: * represents $p<0.05$, ** represents $p<0.01$, *** represents $p<0.001$.

5. Conclusion and Discussion

5.1. Research Conclusion

On the basis of existing research, this paper explores the impact mechanism of the innovation atmosphere of maker space on the bootlegging innovation behavior of the makers in the Chinese context. This paper concludes that the innovation atmosphere of maker space has a significant positive impact on the bootlegging innovation behavior of makers. Makers' innovation self-efficacy plays an intermediary role between the innovation atmosphere of maker space and bootlegging innovation behavior. The innovation resources play a negative role in regulating the innovation atmosphere of maker space and the innovation self-efficacy.

5.2. Management Enlightenment

First of all, in the process of carrying out innovation practice, enterprises should pay attention to the positive reinforcement of employees' innovation beliefs and enhance employees' innovation self-efficacy. In addition to providing employees with necessary innovation resources and other external conditions, enterprises should also pay attention to the internal motivation of employees to enhance their innovation self-efficacy. Only when employees strengthen their innovation belief can they enhance their innovation enthusiasm, initiative and creativity, so as to carry out innovation activities more smoothly and bring innovation benefits to the organization. Secondly, senior leaders of enterprises should face up to and reasonably guide the bootlegging innovation behavior. As a unique resource of the enterprise, the leadership fault-tolerant behavior can reduce the frustration of employees who fail because of bootlegging innovation to a certain extent. Enterprises should not ignore employees' bootlegging innovation behaviors, but should adopt the attitude of trial, error correction and fault tolerance to correctly guide employees' bootlegging innovation behaviors and make them develop along the right track.

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