

Study on the Dynamic Factors of Collaborative Innovation in Cultural and Technological Integration Demonstration Parks

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Abstract: As a type of cross-industry cluster, the construction of demonstration parks is the integration of social economy, science and technology. The paper introduces the quantitative analysis on the source and mechanism of the dynamic factors of collaborative innovation in demonstration parks and it found that the innovation dynamic mainly originates from four dynamic factors: cultural capacity, political support, talents' capacity and the capital support.

1. Introduction

The research of the cultural and technological integration demonstration park is still in its initial stage, especially the research on the dynamic factors of the innovation of the park. This paper integrates the reasons of the enterprises needing collaborative innovation in the cluster, the source of the cooperative innovation power of the demonstration park, and perfects the existing system dynamics theory framework. Through the analysis of exploration, to seek the synergy of innovation dynamic factors and mechanism of demonstration parks.

2. Literature review

2.1 The related theoretical basics

The internal innovative forces include: income driving force, the influence of cluster culture and innovative dynamic. The synergy innovation of research&development is attributed to internal and external forces. The external forces are composed of technology promotion, market demand and competitive pressure, government's supporting force. And the internal forces are profit driving force, the strategic of synergy guidance force, the internal innovation mechanism dynamic. At present, the source of agglomeration rents is the heterogeneity effect formed by industry agglomeration. However, the cluster rents' continuous declining indicates that it's in the recession period.

2.2 The assumption of demonstration park collaborative innovation forces

Based on the previous literature and rent theory, it concludes that synergy innovation forces of the cultural and technological integration demonstration park has following hypothesis: (1) cultural factors: in the process of economic operation, the regional cultural background affects the subject of each economic activity. The cultural connotation of the creative industry is ranked in the first factor, this paper puts forward the following hypotheses: H1: cultural factors play an important role in promoting the synergy of innovation in the demonstration park. (2) policy factors: policy preference is crucial and necessary. Government has responsibility to support the development of new industries. The paper puts forward the following hypotheses: H2: policy factors play an important role in the improvement of collaborative innovation dynamics in demonstration parks; (3) talent factor: the aggregation of demonstration parks is essentially the accumulation of creative talents. This paper puts forward the following hypotheses: H3: talent factors play an important role in improving the synergy of the demonstration park; (4) financial factors: financial support is the most effective factor and puts forward the following hypotheses: H4: financial factors play an crucial role in improving the synergy of demonstration parks.

3. Questionnaire and statistic analysis

3.1 Source of date

The evaluation variables of the collaborative innovation forces divided into the 4 dimensions (cultural indicators, policy indicators, talent indicators, financial indicators) and 16 evaluative indicators (shown in table 3.1) were set up. According to the Likert five scale, the quantitative evaluation index is dividing into five intervals by the important degree.

Table 3.1 Evaluation indicators and validity analysis table

Dimension	KMO	Explanation Variance		Dimension		KMO	Explanation Variance
Cultural Indicators	0.735	79.021%		Talent Indicators		0.833	67.906%
Long history of culture	Rich cultural resources	Strong cultural atmosphere	Complete facilities	Strong cultural culture	University agglomeration	Adequate supply of talent	Prosperity of education
0.832	0.816	0.767	0.857	0.881	0.778	0.827	0.803
Policy Indicators	0.805	78.614%			Financial Indicators	0.855	73.605%
Tax concessions	Public infrastructure construction	Government investment	Financing support	Knowledge-oriented talents	Diversified financing Channels	Rich sources of funds	Strong investment atmosphere
0.819	0.786	0.787	0.834	0.795	0.763	0.749	0.826

3.2 Statistical analysis of data

The survey is hold among management personnel and consumers of demonstration parks. The survey is dividing into two channels: on-line questionnaire websites and interviews questionnaires. Using the Cronbach's alpha measurement in the questionnaire for this study, the resulting coefficient value is 0.723. The coefficients of the Cronbach's alpha for each sub-item are also above 0.7(shown in table 3.1).

3.3 Confirmatory factor analysis for dynamic indicators system

(1) Model identification

Evaluation Index system structured by 4 latent variables, respectively: cultural indicators, policy indicators, talent indicators and financial indicators, in total 16 metrics. Based on the T principle, $(q+1)/2=171$, the model has to estimate 16 factor loads, depending on error variance of 16 measurement variables and correlations between the 16 factors, to be estimated parameter values $t=54<171$, so the model is recognizable.

(2) Evaluation of models

After the model identifying, the path analyzed by the fixed load method and the maximum likelihood estimation method, which verifies whether hypotheses are set up in the evaluation index model. The data in table 3.3 shows the absolute exponent reflected in the fitting index of the model, relative index and the minimalist index is within a reasonable range.

It concluded that the model fitted and the construction validity is good. Therefore, these indicators can be used as a measurement of four potential factors.

4. Causal feedback relation analysis of dynamic factors

Tables 3.2 Confirmatory analysis results

Latent variable	Item	Standardized coefficients	T value	R2	Latent variable	Item	Standardized coefficients	T value	R2	Conclusion
Cultural indicators	1	0.672	10.45	0.526	Cultural indicators	1	0.673	9.13	0.672	Support
	2	0.716	8.23	0.426		2	0.521	10.68	0.541	Support
	3	0.676	8.16	0.325		3	0.670	9.07	0.307	Support
	4	0.578	8.02	0.621		4	0.665	8.74	0.386	Support
Policy indicators	1	0.614	9.34	0.432	Financial indicators	5	0.591	10.45	0.425	Support
	2	0.745	8.63	0.537		6	0.661	10.36	0.502	Support
	3	0.691	9.08	0.533		7	0.784	9.57	0.384	Support
	4	0.724	10.6	0.291		8	0.693	10.79	0.691	Support

Note: ** represents a significant level of 0.05; *** represents a significant level of 0.01.

Tables 3.3 Model fitting goodness test results

Fitting results	X2/df	RMSEA	NFI	NNFI	CFI	IFI	RFI	GFI	AGFI	PGFI
criteria	∈(2,3)	<0.08	0.9<	0.9<	0.9<	0.9<	0.9<	0.8<	0.8<	0.5<

Cultural and technological integration demonstration park is affected by a variety of factors, dynamics can be a demonstration park innovation dynamic factors causality feedback diagram. According to the causality feedback graph, the four subsystems and the innovation power respectively constitute the positive feedback cyclic relation. Based on this, the SD Model (shown in figure 4.1) construction assumes the following: (1) the local cultural environment and consumer demand for cultural experience influenced by the innovation dynamics of the park.(2) talent strength influenced by the degree of innovation of cultural products and the innovation power of the park. (3) the impact of capital investment dynamics of the park on factors such as innovation (4) the support of the government is always growing. To sum up, talent factors, capital factors, policy factors, cultural factors of the four dynamic systems must be mutual influence and restriction, each other constraints. The realization of collaborative innovation development of cultural and technological integration demonstration parks must make up of four systems in collaborative approach to promote the innovation and development.

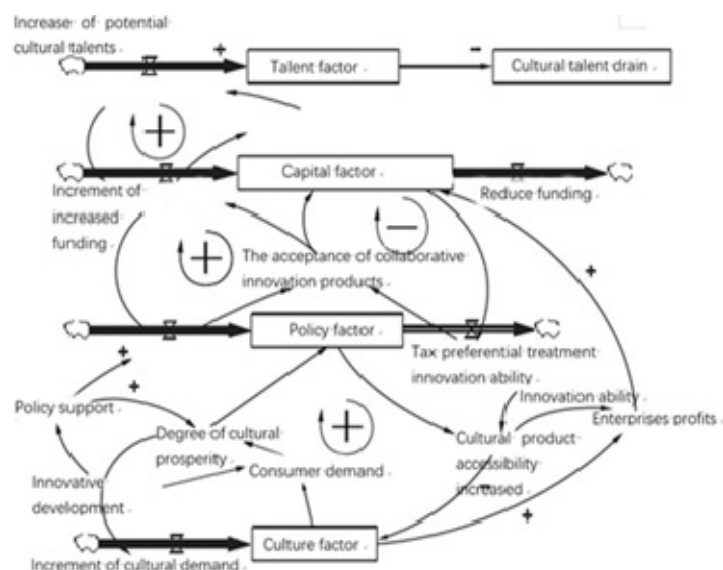


Figure 4.1 SD Model of innovation development

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