

The Comparative Analysis of Entrepreneurial Innovation Cognition in the Three Main Industries

—Take Hebei as An Example

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Abstract—The paper discusses five aspects about innovation to enterprises survival and development, how to set innovative strategic goals of enterprises, the incidence of innovation types to enterprises innovation, the effect factors and results of innovation success and the entrepreneurs' views to policies of innovation in entrepreneurs' innovation cognition of industry, construction industry and service industry as the three main industries in Hebei through comparative analysis. Then it finds the differences of entrepreneurs' innovation cognition in the three main industries and proposes countermeasures about how to improve entrepreneurs' innovation cognition and strengthen independent innovation ability of enterprises.

Keywords—*entrepreneur; the three main industries; innovation cognition; comparative analysis*

I. INTRODUCTION

Innovation is the soul to enterprise survival and development, and it is also the source and power to make the enterprises move forward in the fierce market competition. The entrepreneurs as the soul and core of enterprise innovation, its innovation ability and level play an important role, even the decisive role in the process of enterprises' sustainable development. So, it becomes an important subject that we face in technology innovation activities at present, which to analyze entrepreneurs' innovation cognition and understand entrepreneurs' thinking and resolution of technological innovation. The paper makes systematic and comprehensive analysis about entrepreneurs' technology innovation cognition of industry, construction industry and service industry as the three main industries in Hebei based on the investigation results of the *Questionnaire of Entrepreneurs' Innovation Survey* which designed by National Statistics in 2013-2014, in order to finds the differences of entrepreneurs' innovation cognition in the three main industries and proposes countermeasures about how to improve entrepreneurs' innovation cognition and strengthen independent innovation ability of enterprises[1].

II. THE DISTRIBUTION OF INVESTIGATION SAMPLE

The features of technology economy in industry, construction industry and service industry are different, also

the entrepreneurs' cognition are different. So there are differences in the form, content and result of technology innovation. The entrepreneurs which are investigated by Questionnaire of Entrepreneurs' Innovation Survey of Hebei in 2013-2014 about the distribution of gender, age and education level in industry, construction industry and service industry are as *Tab. 1*.

TABLE I. THE ENTREPRENEURS' DISTRIBUTION OF INNOVATION INVESTIGATION ABOUT THE THREE MAIN INDUSTRIES IN HEBEI IN 2013-2014

Type		Industry Enterprise		Construction Enterprise		Service Enterprise	
		Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)
gender	Male	10536	71.30	212	75.71	3457	56.63
	Female	4221	28.70	68	24.29	2648	43.37
age	29 and under 29	1461	9.90	16	5.71	810	13.26
	30-39	3911	26.50	64	22.86	1857	30.41
	40-49	5637	38.20	111	39.64	2167	35.49
	50-59	3276	22.20	76	27.14	1121	18.37
	60 and over 60	472	3.20	13	4.64	1515	2.47
education level	Doctor	44	0.33	1	0.36	20	0.33
	Master	457	3.12	31	11.07	216	3.53
	Bachelor	3704	25.02	166	59.29	1941	31.79
	College	6213	42.15	79	28.21	2618	42.88
	Others	4339	29.38	3	1.07	1311	21.47

From *Tab.1*, it can be known that the male entrepreneurs are in the majority in industry and construction industry, and the female entrepreneurs are in the majority in service industry. The age of entrepreneurs in the three main industries are focus on 30-49. Among them, the age of entrepreneurs in service industry are younger relatively; The number of people that undergraduates in construction industry are nearly 60%, the postgraduates are 11.07%. The entrepreneurs of construction industry are the highest in education level. The number of people that college students are the most in service industry, it accounts for more than 42.88%. The entrepreneurs of service industry are in the middle in education level. The entrepreneurs of industry are lower in education level

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relatively. The college students account for 42.15% and nearly 30% are under college[2,3,4].

III. THE COMPARISON OF ENTREPRENEURS' INNOVATION COGNITION RESULTS IN THE THREE MAIN INDUSTRIES

Based on the contents of investigation in *Questionnaire of Entrepreneurs' Innovation Survey*, the entrepreneurs' innovation cognition in the three main industries can be divided into five aspects to analyze. They are the effect of innovation to enterprises survival and development, the enterprises to formulate innovative strategic objective, the influence degree of innovation types to enterprise innovation, the influence factors and effects of successful innovation and the entrepreneurs' opinions to relevant policies about innovation[5,6,7].

A. The Comparison of the Effect of Innovation to Enterprises Survival and Development

From *Tab.2*, the entrepreneurs in the three main industries which are investigated in Hebei show the percentage that believe the innovation plays an important role to enterprises survival and development are 27.74%, 30.36% and 20.94% in industry, construction industry and service industry respectively; The percentage that believe it has no effect are 11.85%, 9.64% and 17.76% respectively.

TABLE II. THE COMPARISON OF ENTREPRENEURS' COGNITION TO INNOVATION IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Type		The Percentage of People That Believe It Plays An Important Role(%)	The Percentage of People That Believe It Plays Some Role(%)	The Percentage of People That Believe It Has No Effect(%)
all the enterprises	Industrial enterprise	27.74	60.41	11.84
	Construction enterprise	30.36	60.00	9.64
	Service enterprise	29.94	61.30	17.76
the enterprises which have innovation activities	Industrial enterprise	39.25	56.05	4.70
	Construction enterprise	41.25	58.13	0.63
	Service enterprise	35.02	59.02	5.96

Further analysis, among the enterprises which have innovation activities in the three main industries, the percentage that believe the innovation plays an important role to enterprises survival and development are 39.25%, 41.25% and 35.02% in industry, construction industry and service industry respectively; The percentage that believe it has no effect are 4.7%, 0.63% and 5.96% respectively. It shows that all the enterprises in Hebei as the same as the enterprises which have innovation activities. The level of innovation cognition is higher in construction entrepreneurs, in the middle in industry and is lower in service.

B. The Comparison of the Enterprises to Formulate Innovative Strategic Objective

Among the entrepreneurs that are investigated in the three main industries, the percentages of the enterprises that formulate innovative strategic objective in future years are 54.02%, 77.5% and 48.03% in the industry, construction industry and service industry respectively.

Among the entrepreneurs that are investigated in the three main industries, the percentages of the enterprises that formulate innovative strategic objective in future years are 54.02%, 77.5% and 48.03% in the industry, construction industry and service industry respectively. Further analysis (as *Tab.3*), the innovative strategic objective of enterprises in the three main industries are mainly "increase innovation input and improve enterprise competitiveness". It accounts for 50.79%, 64.98% and 57.74% respectively of all the enterprises. The next is "catch up with and surpass advanced level of the same domestic industries". It accounts for 22.1%, 22.85% and 17.12% respectively of all the enterprises. The enterprises that to choose keep and surpass leading international enterprises is fewer. It shows that the innovation consciousness of construction industry in Hebei is the strongest, the industry is in the middle and the fewest is service industry. The level of innovative strategic objective of all the enterprises are not high, lack of the spirit and courage to catch up with and surpass international leading level.

TABLE III. THE COMPARISON OF ENTREPRENEURS' INNOVATIVE STRATEGIC OBJECTIVE COMPOSITION IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Type	Industrial Enterprise (%)	Construction Enterprise (%)	Service Enterprise (%)
keep the international leading position in the field	4.2	1.84	2.83
catch up with and surpass leading international enterprises of the same industries	6.62	2.77	3.85
catch up with and surpass leading domestic enterprises of the same industries	22.1	22.58	17.12
increase innovation input and improve enterprise competitiveness	50.79	64.98	57.74
keep existing technical level and production operation status	16.14	7.37	17.71
other objective	0.15	0.46	0.75

C. The Comparison of the Influence Degree of Innovation Types to Enterprise Innovation

It can be known from *Tab.4*, among the entrepreneurs that are investigated in the three main industries, industrial innovation is mainly use product innovation and technological innovation. Both of them account for 62.19% in the number of entrepreneurs that are investigated. Construction industry is mainly use technological innovation and organization (management) innovation. Both of them account for 84.66% in the number of entrepreneurs that are investigated. Service industry is mainly use marketing innovation and organization (management) innovation. Both of them account for 70.86% in the number of entrepreneurs that are investigated. It shows that because of the differences in technical and economical

characteristics itself and the demands of innovation, there are different to choose innovation types.

TABLE IV. THE COMPARISON OF THE INFLUENCE OF INNOVATION TYPES TO ENTERPRISE INNOVATION IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Unit: %

Type	All Enterprises	Industrial Enterprise	Construction Enterprise	Service Enterprise
product innovation	32.56	36.05	9.66	23.33
technological innovation	21.58	26.14	43.75	5.81
organization (management) innovation	21.95	19.22	40.91	29.07
marketing innovation	23.91	18.59	5.68	41.79

D. The Comparison of the Influence Factors and Effect of Innovation Success

It can be known from *Tab. 5*, among the entrepreneurs that are investigated in the three main industries, all the entrepreneurs think the top 4 influence factors that affect enterprises' success are high-quality talents (account for 44.4%, 52.81% and 42.87% respectively), entrepreneurs have the spirit of innovation (account for 42.9%, 52.25% and 39.42% respectively), employees to enterprise's identity (account for 36.81%, 48.88% and 38.3% respectively) and sufficient funds to support (account for 36.31%, 39.33% and 36.73% respectively). Comparatively speaking, contraction industry has stronger desire to high-quality talents than industry and service industry, pay more attention to employees' identity.

TABLE V. THE COMPARISON OF MAIN FACTORS AND INFLUENCE DEGREE ABOUT ENTERPRISES' INNOVATION SUCCESS IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Influence Factors	Industrial Enterprise		Construction Enterprise		Service Enterprise	
	Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)
high-quality talents	3461	44.40	94	52.81	1068	42.87
entrepreneurs have the spirit of innovation	3344	42.90	93	52.25	982	39.42
employees to enterprise's identity	2869	36.81	87	48.88	954	38.30
sufficient funds to support	2830	36.31	70	39.33	915	36.73
incentive measures within enterprise	2798	35.89	64	35.96	906	36.37
open information channels	2752	35.30	57	32.02	825	33.12
effective technology strategy or plan	2736	35.10	51	28.65	731	29.35
favorable policy to support	2518	32.30	45	25.28	722	28.98
reliable partners of innovation	2331	29.90	39	21.91	717	28.78

It can be known from *Tab. 6*, among the entrepreneurs that are investigated in the three main industries, they have views about each incentive measure. They all think the best result of incentive measure is increase in wages or bonus (account for 48.96%, 50.56%, 45.17% respectively), next is post adjustment or promotion opportunity (account for 38.36%,

46.63% and 39.87% respectively). Comparatively speaking, construction industry is more generally uses increase in wages or bonus, post adjustment or promotion opportunity and train or further study to motivate employees' innovation, but the industry lacks of emphasis on use staff promotion and train to stimulate innovation.

TABLE VI. THE COMPARISON OF MAIN FACTORS AND INFLUENCE DEGREE ABOUT ENTERPRISES' INNOVATION SUCCESS IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Incentive Measures	Industrial Enterprise		Construction Enterprise		Service Enterprise	
	Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)	Number of people (person)	Proportion (%)
increase in wages or bonus	3815	48.96	90	50.56	1126	45.17
post adjustment or promotion opportunity	2989	38.36	83	46.63	994	39.87
train or further study	2393	30.71	79	44.38	871	34.94
material incentive like automobile, housing and so on	1015	13.03	21	11.79	266	10.67
stock or option	747	9.59	20	11.24	242	9.71

E. The Comparison of Entrepreneurs' Views to Relevant Policies about Innovation

It can be known from *Tab. 7*, among the entrepreneurs that are investigated in the three main industries, they generally believe the relevant policies about encourage enterprise to attract and cultivate talents (account for 80.41%, 91.92% and 91.04% respectively) and create and protect intellectual property (account for 79.4%, 91.69% and 90.03%) have the greatest impact on enterprises to carry out innovation activities. The next are the impact of supportive policies of priority to the development of industries (account for 78.62%, 90.38% and 89.97% respectively) and relevant policies about financial support (account for 78.61%, 90.26% and 89.58% respectively). The last are the impact of the policies about relevant tax preference and relief. Comparatively speaking, construction industry has the highest degree of recognition about the impact of relevant policies to enterprises to carry out innovation activities, next is service industry, the lowest is industry.

IV. THE DIFFERENCES OF CHARACTERISTICS OF ENTREPRENEURS' INNOVATION COGNITION IN INDUSTRY, CONSTRUCTION INDUSTRY AND SERVICE INDUSTRY

By comparing the distribution of entrepreneurs in industry, construction industry and service industry of Hebei and the views to the role and types of innovation, influence factors and effects of innovation success, relevant policies about innovation and so on, it finds the differences of characteristics of entrepreneurs' innovation cognition in the three main industries as follows:

TABLE VII. THE COMPARISON OF THE RELEVANT POLICIES TO IMPACT ENTERPRISES TO CARRY OUT INNOVATION ACTIVITIES IN THE THREE MAIN INDUSTRIES OF HEBEI IN 2013-2014

Types of Policies	The Proportion of Influence Degree that the Entrepreneurs Think "Less" or "No Effect" (%)		
	Industrial enterprise	Construction enterprise	Service enterprise
products of science and technology development exempt from import tax policies	30.20	14.96	12.77
preferential policies about technology transfer and development income exempt from value-added tax and technology transfer tax shelter	28.85	13.54	12.29
policies about tax shelter of high and new technology enterprise	27.11	13.18	12.08
policies about accelerated depreciation of special instruments and equipments in enterprise R&D activities	26.25	11.28	11.87
preferential policies about enterprise R&D weighted deduction tax revenue	25.77	11.28	11.62
relevant policies about financial support	21.39	9.74	10.42
supportive policies of priority to the development of industries	21.38	9.62	10.03
relevant policies about create and protect intellectual property	20.60	8.31	9.97
relevant policies about encourage enterprises to attract and cultivate talents	19.59	8.08	8.96

(1) The entrepreneurs in construction industry have the highest quality, in industry have the lowest. It can be known from the investigation of entrepreneurs' education level in the three main industries, the number of entrepreneurs that are bachelor or above in construction industry account for 70.72%, which have the highest education level; the number of entrepreneurs that are bachelor or above in service industry only account for 35.65%. It has 35.07 percentage points below construction industry; the number of entrepreneurs that are bachelor or above in industry account for 28.47%. It has 42.25 percentage points below construction industry. Obviously, entrepreneurs of construction industry in the three main industries have the highest quality, but the entrepreneurs of industry which as the main force of innovation have lower quality. It is not good for improve innovation ability of the industry as a whole.

(2) The entrepreneurs in construction industry have the highest cognition degree of innovation, in service have the lowest. It can be known from the investigation of entrepreneurs' views to the effect of innovation, the number of entrepreneurs in construction industry believe innovation plays an important role to enterprise survival and development account for 30.36%. The industry is in the middle that account for 27.74%. It has 2.62 percentage points below construction industry; the service industry is the lowest that account for 20.94%. It has 9.42 percentage points below construction industry. This illustrates entrepreneurs in construction industry of Hebei have the highest cognition degree of innovation, but the service industry have the lowest. It has a certain relationship with the entrepreneurs' quality level in industries.

(3) The innovation cognition in construction industry is the strongest and the weakest is service industry. It can be known from the investigation of enterprises to set innovation strategic objective in the three main industries, the number of

enterprises that express they set innovation strategic objective in the future years in construction industry account for 77.5%; the industry is in the middle that account for 54.02%. It has 23.48 percentage points below construction industry; the service industry is the lowest that account for 48.03%. It has 29.47 percentage points below construction industry. Then combine with the specific innovation strategic objective that the three main industries to choose, it is mainly "increase innovation input, improve enterprise competitiveness", but keep surpass the international leading position is less. This illustrates the construction industry has the strongest innovation cognition in Hebei and it has clear innovation mentality. The service industry is the weakest; all the enterprises' level of innovation strategic objective is not high. It is an important element to restrict improves innovation ability of enterprises in Hebei.

(4) The construction industry has the strongest desire to talents; the service industry is the lowest. It can be known from the investigation of entrepreneurs' views to the main factors and influence degree of innovation success in the three main industries, the entrepreneurs in construction industry that think the main influence factors to innovation success of enterprises are high quality talents and innovative entrepreneurs, the two factors account for 52.81% and 52.25% respectively. The enterprises in industry that choose the two factors are account for 44.4% and 42.9% respectively; in the service industry are account for 42.87% and 39.47% respectively. Obviously, the construction industry has the strongest desire to talents, in the middle is the industry and the service industry is the lowest.

(5) The enterprises in construction industry have the highest degree of recognition to the innovation policies, the industry have the lowest. It can be known from the investigation of the relevant policies to impact on enterprises to carry out innovation activities, although it thinks the effect of policies are in the same order, the degree has great differences. The "relevant policies of encourage enterprises to attract and cultivate talents" and "relevant policies of create and protect intellectual property" in construction industry have the most impact on enterprises to carry out innovation activities. The proportions are 91.92% and 91.69% respectively. The proportion of service industry also reaches 90%, but is only around 80% in industry. Obviously, the construction industry has the highest degree of recognition to relevant policies about impact on enterprises to carry out innovation activities, the next is service industry and industry is the lowest.

V. CONCLUSION

Through compare the cognition of entrepreneurs to innovation in the three main industries, it finds in the aspect of technology innovation of enterprises in Hebei, there generally exist some problems, like the entrepreneurs' quality is not high, weakness in innovation awareness, innovation strategy is not clear, encourage innovation have single means, supportive policies of innovation are not complete and so on. In order to solve these problems, it needs undertake from the following five aspects[8,9]:

Firstly, build system to shape entrepreneurs and cultivate a team of entrepreneurs with high quality. The enterprises in Hebei, especially industry enterprises are short of entrepreneurs with high quality. It is an important factor to restrict the improvement of innovation ability. Under the new normal, it should establish and improve the system of cultivate, select, educate and manage entrepreneurs create a good environment and condition for train a team of entrepreneurs with high quality.

Secondly, strengthen innovation consciousness of entrepreneurs and cultivate entrepreneurs' innovation ability. The entrepreneurs in Hebei have not high degree to innovation cognition, weakness in innovation awareness. They are the key factors to restrict innovation ability improvement. Especially the degree of innovation cognition in industry enterprises, which as the main force of innovation, that lower than construction enterprises, it is worrying. In order to realize innovation cognition improvement, it should improve entrepreneurs' consciousness of competitiveness, risk and transfer of technology. Through cultivate entrepreneurs' abilities of acute insights and observation, creative thinking, works hard with ingenuity, incentive and induction; it can realize entrepreneurs' innovation ability improvement.

Thirdly, formulate effective technological innovation strategy and improve innovation efficiency of enterprises. In the enterprises of Hebei, nearly half of enterprises are not formulate innovation strategy objective and unclear of future developing direction. It makes innovation activities hardly to carry out. If the enterprises want to reverse the status, the enterprises without innovation strategy should formulate as soon as possible. The enterprises that formulate innovation strategy should consider the situation and constantly update innovation strategy to improve innovation efficiency.

Fourthly, choose diversified incentive measures and improve employees' innovation enthusiasm. The differences of technical employees' demands determine the diversity of incentives. The enterprises should flexible use method of material incentive and further expand way of spiritual incentive to stimulate self-responsibility and career-ambition of technical employees, form a good atmosphere that make bold innovation of technical employees.

Fifthly, improve policies of fiscal and tax supporting. All the entrepreneurs in Hebei think the relevant policies of talents and protect intellectual property have the most impact. The next is the effect of industry support and financial policy. Finally is the effect of various tax relief policies. If the enterprises want to improve policies to guidance and support of innovation, they should perfect the system of talents' service and support, intellectual property protection mechanism and supportive policies of finance and tax.

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