Entrepreneur Higher Extroversion's Impacts on Innovation Performance of Start-ups

Yu Song
School of Economics and Management
North China University of Technology
Beijing, China

Xuezhi Sun
Cavite State University
Indang City, the Philippines

Yi Hua
Department of Training
Zhongguancun Institute for Innovation
Beijing, China

Abstract—**The purpose of this paper is to investigate if higher level of extroversion of entrepreneurs and higher degree of social activities can help increase start-up companies' innovation performance. Through a survey to 233 entrepreneurs, this research finds out that communication with people from diverse fields, organizing leisure activities, external meetings and professional activities such as academic conference, all have positive impacts on innovation performance. Besides, the influential mechanism of professional activities is negatively moderated by entrepreneurs' extent to participate in leisure activity and the abilities to keep new social interactions. This research further discusses research opportunities in the near future.**

Keywords—social interactions; entrepreneurship; innovation; start-up companies

I. INTRODUCTION

Innovative companies have become the most popular objects for researches in the field of innovation management. In China, a wave named "Innovation and Entrepreneurship" has swept the whole country for years. Large amount of newly start-up companies had been registered. But unfortunately, it is less likely for all entrepreneurs to be successful. The personal characteristic of these entrepreneurs has been verified to be of great importance, so do the social capitals that they can get access to. Even under the same circumstances that they have similar or even the same social capitals, it is still not guaranteed that all entrepreneurs could end up with equivalent level of successfulness. Consequently, how these entrepreneurs perform to run their companies forms the valuable research topic. To be specific, entrepreneurs with diverse personal characteristics might perform with great diversity in similar situation. For example, an open-minded or extrovert person might be extremely active for social event and might also be more talkative when meeting new person. The likelihood for him to know new VCs might be possibly higher than the ones who are more introvert. The purpose of this research is to empirically test that, for similar circumstance, can different levels of extroversion of an entrepreneur result in different level of innovation performance.

II. THEORY FOUNDATIONS

Starting up a new business require the combination of both internal and external resources for the purpose of product and service innovations [1]. Hence, knowledge is required to be shared within a proper period, especially for new products or services that required by market. Such knowledge sharing includes not only making best use of internal knowledge efficiently, but also combining variety kinds of external knowledge creatively [2]. The inbound flow of knowledge might be accelerated through the interactivities among entrepreneurs.

In the age of "innovation and entrepreneurship", the number of entrepreneurs has increased dramatically, but with different initiatives. Some of them were influenced greatly by family background [3], while some of them were holding the dream of being a successful businessman or even establishing their business kingdoms by fighting lifelong from empty-handed. With different initiatives and/or goals in mind, their behaviors in managing their businesses also differs greatly [3].

Different patterns of behavior may result in different way of knowledge flow. In fact, for all kinds of business and especially for SMEs and start-ups, social capital has been verified to be of great importance [4], [5]. In the starting-up stage, entrepreneurs are also eager to obtain as much social capitals as possible. Unlike knowledges in terms of technologies that can help improving products or services, social capitals in multiple terms sometimes can bring even better benefit to a company. For example, a social event such as business dinner might bring VCs to some entrepreneurs but means nothing than simply a meal for others.

Such phenomenon can happen in variety forms and it is determined primarily by certain characteristics of entrepreneurs [6]. Researches on entrepreneurs had found that extroversion is one typical dimension of personal

characteristics to describe how an entrepreneur looks like or performs. For entrepreneurs, most of them are working in an incubator or industry park, which means they are surrounded by the ones of similar kind. No matter whether their businesses have connections or not, they must communicate or interact with each other in one way or another, such as entertainment activities arranged by officials or individuals or business-related activities. Activities or event represented by entertainment were named as unofficial social interactions, while business related ones were referred as official social interactions.

Since people have different personal characteristics, their performances or even attitudes towards something also varies. Consequently, the outcomes or benefits they can get are different. Entrepreneurs keep on running their business and interacting with surroundings in their own way. But one thing for sure is that they are looking for more opportunities for themselves and for their companies in order to make their companies survive [7].

Since the inbound process of open innovation can help accumulating knowledge, and entrepreneurs are indeed looking for more chances to expand their businesses or even personal social network, this research are going to test how external activities can potential influence innovation performance. Further, is higher level of extroversion always good for start-ups? Moderating effects will be tested.

III. RESEARCH DESIGN

A. Independent Variables

Since extroversions has been verified to be of importance for entrepreneur[6], this research will continue to use the item in the questionnaire from mature research in Likert-7 scale, but with some improving modification. In this research, respondents are required to evaluate the changing level of extroversion of themselves by comparing their present situation as entrepreneurs with their original characteristics before starting-up businesses. The five items are:

- I like communication with persons from same industry/field (label: EXT1).

- I like communication with persons from another industry/field (label: EXT2).

- I always participate in leisure activities (label: EXT3).

- I always arrange leisure activities (label: EXT4).

- I am good at keeping connection with new friends (label: EXT5).

Social events that might bring potential benefits to companies include industrial summit, meetings among partners and even academic event. The following five items are included in the questionnaire:

- I always attend external meetings, both official negotiations/discussions and unofficial meetings (label: ACT1).

- I always participate in industrial summit, as representative of company or as individual (label: ACT2).

- I always attend academic and/or technological conferences (label: ACT3).

- I always participate in exhibitions and/or trade promotion activities (label: ACT4).

- I have exchange working experiences, through official collaborations between partners (label: ACT5).

Independent variables are measured in Likert-7 scale. For each item, respondents are required to make evaluations on themselves. 7 indicates "strongly agree / most likely", while 1 indicates "strongly disagree / most unlikely".

B. Dependent Variables

As the means to measure the outcome or performance of innovation, number of IPs was often used by researchers in the field of knowledge management. In this research, since independent variables are attitudes being measured based on self-evaluation, individual effects will definitely be introduced. But it is likely that an individual should have same, at least similar, bias on all variables. In this case, this research innovatively measures dependent variable by asking entrepreneur to make subjective evaluations on the innovation performance of his/her company. This way of research design has primarily three advantages:

First, individual effects from each respondent can be controlled. One entrepreneur is required to finish the survey within several minutes. His/her attitude of bias is unlikely to change. So same bias on all variables will not introduce too much influences on regression models.

Second, company effects introduced by special situation of each company can be processed. The number of IP (intellectual property) contains only registered patent. Newly introduced/upgraded products and/or services sometimes are not correlated with changed of IP numbers. For example, software copyrights for internal ERP system or IT system may have nothing to do with the businesses. Since companies have their own special situation, the evaluations by entrepreneurs from internal are more effective to reveal the actual situations.

Third, industry effects can be filtered. As illustrated above, number of IPs as well as number of new product or upgrades might means differently for various companies. For example, two companies might both introduced same amount of new products/services within one year, but it is not comparable because of industry differences, which is named as industry effects. By measuring entrepreneurs' judgements according to industrial averages, such industry effects can be filtered.

C. Data

Totally 267 copies of questionnaires were collected, 233 valid, as shown in "Table I". The entrepreneurs are from incubators and high-tech parks in Beijing. Cronbach's

coefficient alpha is approximately 0.7, with acceptable reliability. Descriptive analysis to all variables is given in "Table II". The perceived innovation performance (INNO) follows normal distribution. Hence, it can be inferred that the research design eliminated all individual effects and industry effects. Further analysis will be more persuasive.

effects, all variables are put into regression model hierarchically. Regression result is shown in "Table III".

In models (1-2), extroversion and social activities are put into the regression separately. For an extrovert entrepreneur, his/her cross-industry communication and interactivities (EXT2) has been verified to be significant in all cases, which is more important than the communications with persons from same field. His/her potential to participate in leisure activities does not have significant influence on innovation performance, while his/her potential to organize leisure activities is important.

From social activities' perspective, external meetings with other companies and professional technological or academic conference are both verified to be of high significance. Other kinds of social interactions such as exchange experiences (ACT5) is also tested to be significant in only model (3-5).

For main function (model 3), heteroscedasticity tests show that the model is valid. Two tests are Breusch-Pagan / Cook-Weisberg test (0.1534) and White's test (0.0584). Ramsey RESET test (0.124) indicates no omitted variables and VIF test (1.36) reveals no severe linearity. Using gender and firm size as control variables, the results remain the same. Regression models are not reported.

TABLE I.   ENTREPRENEURS SAMPLE SET

	Firm Size (Number of Employee)				Total
	≤10	11-50	50-100	>101	
Male	41	59	5	4	109
Female	51	53	14	6	124
Total	92	112	19	10	233

TABLE II.   DESCRIPTIVE ANALYSIS

Variable	Mean	Sd	Min	p50	Max
EXT1	4.910	0.590	4	5	6
EXT2	4.860	1.070	2	5	7
EXT3	5.540	0.980	2	6	7
EXT4	4.870	1.180	2	5	7
EXT5	5.570	1.060	3	6	7
ACT1	4.900	0.950	2	5	7
ACT2	6.220	0.870	3	6	7
ACT3	3.750	1.280	1	4	7
ACT4	5.480	1.130	3	5	7
ACT5	3.860	1.430	1	4	7
INNO	4.310	1.370	1	4	7

IV.   EMPIRICAL FINDINGS

A. OLS Regressions

This research uses OLS to run regression model. In order to better identify the causal relationship and intermedia

TABLE III.   EMPIRICAL RESULTS FROM OLS REGRESSIONS

	(1)	(2)	(3)	(4)	(5)
	EXT	*ACT*	*Main-Function*	*Moderating1*	*Moderating2*
EXT1	0.108		-0.002	0.014	-0.007
EXT2	0.793***		0.818***	0.811***	0.816***
EXT3	0.055		0.008	0.238**	0.272***
EXT4	0.100*		0.073***	0.073***	0.075***
EXT5	0.091		0.020	0.017	0.233**
ACT1		0.486***	0.432***	0.435***	0.439***
ACT2		0.098	0.039	0.041	0.055
ACT3		0.461***	0.495***	0.834***	1.201***
ACT4		-0.026	-0.009	-0.008	-0.017
ACT5		0.072	0.058**	0.052*	0.044*
ACT3 x EXT3				-0.061**	-0.069***
ACT3 x EXT5					-0.058**
_cons	-1.377*	-0.540	-4.551***	-5.862***	-7.207***
N	233	233	233	233	233
adj. R2	0.423	0.472	0.891	0.893	0.896
* p < 0.10, ** p < 0.05, *** p < 0.01					

B. Moderating Effects

Models (4-5) show that though EXT3 is not significant in direct regressions, it indeed moderating the effects from professional social interactions (ACT3) on overall innovation performances. Abilities in maintaining new social connection (EXT5) is playing similar role. When a person is too active in social event, his/her concentration might be distracted from work. The moderating effects are tested to be negative. According to coefficient, both marginal moderating effects

have similar trends. But wiliness or potential to participate in leisure activities' (EXT3) moderating effect is slightly greater than that of abilities to keep new social connections (EXT5). Comparing with the insignificancies in model (1-3), it can be possibly inferred that extroversions on unofficial activities can also bring benefits to entrepreneurs, but with decreasing marginal effects.

V. DISCUSSIONS AND CONCLUSION

A. Discussions to Empirical Results

Unexpectedly, communications with peoples from same field (EXT1) have no obvious influence on innovation outcome. Potential reasons might be as follows. First, entrepreneurs themselves have comparatively fixed social networks within their business field, and they have clear goals and expectations on themselves and on each other. Second, considering also secrete protection issues, the degree of their interactivities might not have must impact on their businesses. Third, communications and/or interactivities can be in different form, which is not specified in previous researches, and neither in this one. Without more specific differentiations, the influences cannot be specified. This also forms future research direction. Fourth, another potential possibility for such result is that all entrepreneurs are from neighbors. The information or knowledge exchange between companies from same field might be finished already long ago. In the survey, such time-series cannot be observed. Being a limit of this research, it is also a guide for future research.

Beyond expectation, cross industry/field communication has significant impact on innovation performance. Entrepreneurs from different fields form no competition or can even collaborate with each other. So, their social interaction might have better outcome, including not only official business activities, but private activities as well, such as leisure activities. The research also reveals that participating and organizing leisure activities both have positive impacts on innovation performance. Interestingly, though the one who are willing to organize leisure activities seems to be more extrovert than the ones who only participate, their willingness on organizing does not moderating the causal relationship between social activities (represented by ACT3) and innovation performance. The two moderating roles are played by participating leisure activities (EXT3) and proficiency in keeping new social connections (EXT5).

But empirical finding shows that higher level of extroversion results in slightly lower causal impact from social activities on innovation performance, but only limited to technological/academic activities. The reason is that such professional activities are directly related with companies' R&D. But R&D requires concentration, which can be viewed as kind of introvert instead of extrovert. Hence considering knowledge flow and information exchanges, R&D related activities (represented by ACT3) has positive impact on innovation performance. But if an entrepreneur is too extrovert in unofficial manner, such impacts will be

weakened. For work exchange (ACT5), the situation is the same.

B. Conclusion

Based on previous researches, this research empirically tested how the extroversion of entrepreneurs and their social interactivities can potentially influence innovation performances. Since individual effects and industrial effects are always hard to exclude, this research made attempt to measure the comparative level of innovation performance by questionnaire to entrepreneurs. Making such substitution can exclude industrial effects and company effects to a large extent, but individual effects might be introduced because of entrepreneur's personal attitudes. Since all variables are measured according to respondents' subjective attitude and each respondent is supposed to have similar bias on all items in questionnaire survey. Hence, individual effects will be automatically processed in regression analysis.

This research finds that for entrepreneurs, comparing with themselves: first, higher extent in communication with people from diverse fields will result in higher innovation performance; second, more extrovert to organize leisure activities also has certain impact on innovation performance; third, more external meetings will help heighten innovation performance; fourth, more professional activities such as academic conference will have positive impact on innovation performance, and this influential mechanism is negatively moderated by the frequency or tendentiousness to participate in leisure activity and the abilities to keep new social interactions.

Lastly based on the empirical finding, people may question that: is the level of introvert positively moderating the mechanism? This is a good research question for next step and to test is the moderating effects of extrovert into details, or even test if the influences on innovation performance is non-linear.

REFERENCES

[1] Brown, T.E., Sensor-Based Entrepreneurship: A Framework for Developing New Products and Services. Business Horizons, 2017. 60: p. S0007681317301064.

[2] Titus, V., J.M. House, and J.G. Covin, The Influence of Exploration on External Corporate Venturing Activity. Journal of Management, 2014. 43(5): p. 1609-1630.

[3] Zattoni, A., L. Gnan, and M. Huse, Does Family Involvement Influence Firm Performance? Exploring the Mediating Effects of Board Processes and Tasks. Journal of Management, 2012. 41(4): p. 1214-1243.

[4] Batjargal, B., Internet entrepreneurship: Social capital, human capital, and performance of Internet ventures in China. Research Policy, 2007. 36(5): p. 605-618.

[5] Cao, Q., Z. Simsek, and J.J.P. Jansen, CEO Social Capital and Entrepreneurial Orientation of the Firm. Journal of Management, 2015. 41(7): p. 1957-1981.

[6] A, S.M.S., Frequency of dream sharing: The effects of gender and personality. The American Journal of Psychology, 2010. 123(1): p. 9.

[7] Hendrikse, W.D.G., Social interactions and product quality: the value of pooling in cooperative entrepreneurial networks. Small Business Economics, 2018. 50(4): p. 13.

[8] Song Yu, Z.J., Tao Xiaobo. How Entrepreneurs Utilize Social Interactions and Lead Companies to Success: A New Research Perspective to Open Innovation. in 2018 Portland International Conference on Management of Engineering and Technology (PICMET). 2018. Honolulu, HI, USA: IEEE.