


Research of Entrepreneurial Candidate: Exploring Motivation and Prospective Technological Innovation in Singapore

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ABSTRACT

The research looks at the relationship between the motivations and prospective technological innovation of entrepreneurial candidate in Singapore. The study seeks to discover and develop a model of the link between the motivation and innovation. A research model was developed around eight hypotheses. Two questionnaires of twenty-two items was distributed to candidates who eager to start their new business in Singapore. One hundred and twenty six valid responses were received and analyzed. The findings from this study will be useful beyond creating a better understanding and appreciation of the alignment between motivations and prospective technological innovation. Understanding the trend of behaviors from candidate to start-up entrepreneur, it would be better to explore what it will take to increase the likelihood of entrepreneurial success as ways of social and economic development. The study furnished some useful conclusions to candidate of entrepreneurship that which kinds of innovation could be utilized around the different motivation by themselves.

Keywords: *Entrepreneurship, Candidate, Start-up entrepreneurial, Motivation, Innovation, Technological innovation.*

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Highlights of this paper

- The study explore the types of motivation and prospective technological innovation of entrepreneurial candidates in Singapore.
- Through the method of post-positivistic, relationship will be opened up between the motivation and prospective technological innovation of candidates

1. INTRODUCTION

Some blanks of research are in the field of entrepreneurship and innovation, particularly in investigating the relationship between the motivations of entrepreneur's candidate and prospective technological innovation.

The candidate is precondition of start-up entrepreneur. The study will seek the candidates who want to start their new business. The goal of this research is to find out the relations between motivations of candidate and technological innovation. As a business will neither start up nor succeed without motivation, we can safely conclude that motivation is one of the most important factors in entrepreneurship fields. As a candidate, another factor is which kinds of technological innovation be carried out by them in future. Thus, there is wide significant to explore the relationship between two concepts. A post-positivist approach is adopted as the most appropriate way of uncovering this link in the research.

Ultimately, the findings of this study will inform the candidate how they can better carry out different and suitable technological innovation to adapt and develop business endeavors in empirically-supported ways, resulting in an increase in the success rate of entrepreneurship.

2. LITERATURE REVIEW

In many new enterprises, motivations were the driving force encouraging people who have entrepreneurial abilities and conditions to start a business (Olson and Bosserman, 1984). A central tenet to economics is that individuals respond to incentives (Benabou and Tirole, 2003) and there are many forms of incentives present when one engages in entrepreneurial activities. In this study, the researchers sought to analyze motivations among different start-up entrepreneurs particularly. While there are many different types of entrepreneurs as entrepreneurs are classified differently across the entrepreneurship process, those in the start-up stage have not been extensively studied and it is worth looking into what are their needs (i.e., motivation) to stimulate entrepreneurship. It may determine many aspects of the entire process on the field of entrepreneurship (Suzuki *et al.*, 2002). As one of the objectives in the study, motivation is the most important factor linking entrepreneurship and innovation.

Success of the enterprise depends on people's motivation to become entrepreneurs (Shane *et al.*, 2003). The entrepreneur's motivation is important not only because it is the starting point of a new venture formation, but also it determines many aspects of the entire process of entrepreneurship (Suzuki *et al.*, 2002). Based on research exploring motivation of entrepreneurship, Kuratko *et al.* (1997) classified four types:

1. Extrinsic reward: Focuses mainly on the form of money and shares.
2. Intrinsic reward: Focuses mainly on the internal control and achievements needs.
3. Independent: They are bosses and have the freedom to make decisions.
4. Family security: Entrepreneurs provide protection for themselves and their families through their entrepreneurial ventures.

Robichaud *et al.* (2001) refined Kuratko *et al.* (1997) scale by adding in new descriptors, including 'close to home', 'protection after retirement', and 'improving the quality of life'. Robichaud *et al.* (2001) built up the improved model and believed start-up entrepreneurs sought goals through business ownership. Entrepreneurial motivation determined the start-up entrepreneur behavior patterns and success of business. Currently, the measurement model of motivation and improved model of motivation proposed by Kuratko *et al.* (1997) and Robichaud *et al.* (2001) respectively carried out very broad and representative studies about types of motivation.

In the fields of technological, innovation is always described as an essential tool to increase the productivity and competitiveness of enterprise, as well as to boost the regional development (Moraes *et al.*, 2010). Dewar and Dutton (1986) are representatives of "Technical innovation" theory deeply. Their research concludes: "technological innovation" includes three factors: competitive factor, enterprise factor, and monopolistic factor. Such as technical design, production, finance, management and marketing, Freeman (1988) points out that the technological innovation contains all steps of the introduction of new products or processes.

There are two broad categories of innovation intensity: incremental innovation and radical innovation (Ettlie *et al.*, 1984; Dewar and Dutton, 1986; Sheremata, 2004). Incremental innovation is a subtle improvement for existing products' features and properties, with a low requirement for technical capacity and resource of the enterprise (Nelson and Winter, 1982; Ettlie *et al.*, 1984; Tushman and Anderson, 1986). An incremental innovation will build a radical innovation is competence-destroying, requiring completely new knowledge and/or resources. It is based on major technological changes and a set of different principles of technology. It usually opens up new markets and potential applications (Dess and Beard, 1984; Dewar and Dutton, 1986). Although radical innovation may bring about enormous challenges to existing enterprise at times, it is often the basis for new enterprises to create markets that may cause major changes in the whole industry (Henderson and Clark, 1990; Daft, 2000). Radical innovation leads to products, processes or services with unprecedented performance characteristics, creating changes in its wake that transform existing markets or industries or create new ones (Amanda and Edward, 2008).

As a conclusion, Fours types of motivation and two types of technological innovation would be used in this research. Motivation of entrepreneur candidate could be classified extrinsic reward, Independent, intrinsic reward and family security (Kuratko *et al.*, 1997; Robichaud *et al.*, 2001). On the other side, technological innovation could be classified incremental innovation and radical innovation (Dewar and Dutton, 1986; Sheremata, 2004).

3. METHODOLOGY

A post-positivistic framework is adopted as it views the content of study as a kind of existence that justifies research into the relationship between the candidate's motivation and technological innovation. After exploring by qualitative approach in the literature review, quantitative approaches to generate reliable and valid data would be used in analytical research on how the candidate's motivations influence the technological innovation.

Entrepreneurial motivation of candidate comes from the brain and belongs to individual experience. There will be presented by entrepreneurship. Therefore, this study will research the validation and interpretation of these two concepts through candidate's sensory, conscience and survey. On the other hand, technological innovation really exists in the world. In the real field, only the existence of a start-up entrepreneur can produce motivation and innovation for competition, which may lead to good performance in future. The candidate is the precondition of their performance during the stage of entrepreneurship.

The study focused on candidate in Singapore and employed two questionnaires. One pertained to entrepreneurial motivation of candidate and its four subsets (Kuratko *et al.*, 1997; Robichaud *et al.*, 2001) and the other pertained to technological innovation and its two subsets (Dewar and Dutton, 1986; Sheremata, 2004). Both

questionnaires were then analyzed for their reliability and validity, and then sent out to 200 entrepreneurial candidates in Singapore. A total of 126 valid responses were received and used for statistical analysis.

4. THE RESEARCH MODEL

To explore the research, a model was created to investigate the entrepreneurial candidate how their motivations influence prospective technological innovation by researcher in Singapore. According to the literature review in the study, Candidate's motivations are regarded as independent variables with the innovation as dependent variables. The Figure 1 below charts the way the study will explore the correlation between motivation (independent variables) and prospective technological innovation (dependent variables).

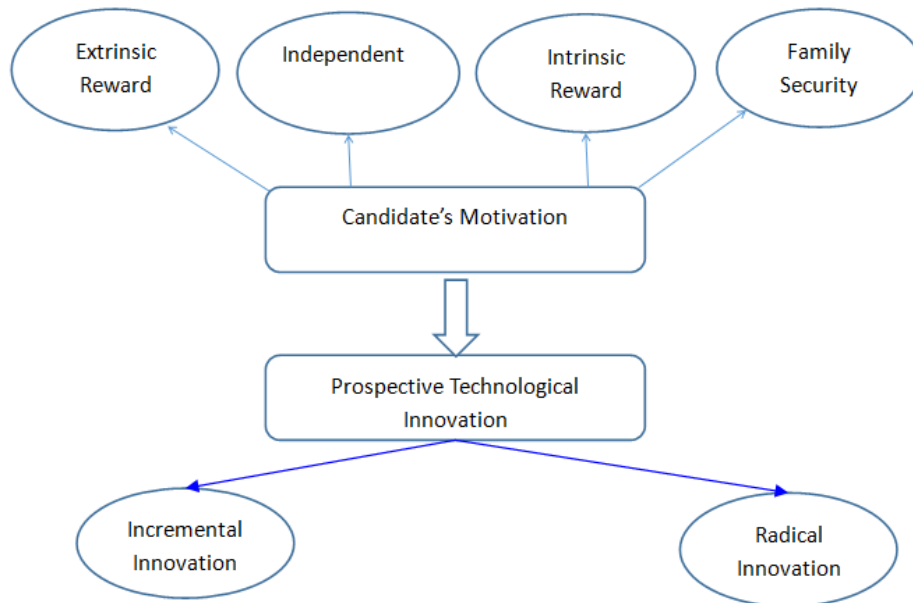


Figure-1. Research model in study.

Source: Author's desk research.

The research hypotheses are as follow:

Hypothesis 1 : There is a correlation between the motivation of extrinsic reward and incremental innovation.

Hypothesis 2 : There is a correlation between the motivation of independent and incremental innovation.

Hypothesis 3 : There is a correlation between the motivation of intrinsic reward and incremental innovation.

Hypothesis 4 : There is a correlation between the motivation of family security and incremental innovation.

Hypothesis 5: There is a correlation between the motivation of extrinsic reward and radical innovation.

Hypothesis 6 : There is a correlation between the motivation of independent and radical innovation.

Hypothesis 7 : There is a correlation between the motivation of intrinsic reward and radical innovation.

Hypothesis 8 : There is a correlation between the motivation of family security and radical innovation.

5. IMPLEMENTATION OF RESEARCH

A primary statistical analysis includes description of responses and analyzing of the reliability and validity. Multiple Regression was deployed to learn about the correlation and causation between several independent variables and a dependent variable.

5.1. Description of the Responses

5.1.1. Gender

Previous research found out that women were less likely to pursue a new business (Reynolds and Curtin, 2008; Verheul et al., 2010). Within the valid questionnaires, 74 participants were males and 52 participants were females. Because the survey was distributed randomly, the proportion of males should be higher than females in the valid questionnaires areas based on the surveys returned.

5.1.2. Age

Among the questionnaires, 76 participants were between the ages of 20 and 30; 36 participants between ages 30 and 40; and 14 participants between 40 and above 50. Because of random distribution, young candidates were more likely to start a new business in Singapore.

5.1.3. Education Background

Within the sample population, 72 participants obtained a Diploma, 38 participants obtained a Bachelor’s degree, and 16 participants obtained a Master’s degree as their highest education qualification respectively. Facing a new challenge, making a new business, most entrepreneurial candidates obtained a Diploma and Bachelor’s degree in Singapore.

5.1.4. Position in Company among the Participants

56 participants had a junior executive role in their company, 50 participants had a middle executive role and 20 participants were with a senior role in their company. The people who were in junior and middle positions are tended to want to start a new business. The people who were in senior executive role were less likely to pursue a new business. Table 1 presents the statistic form of responses.

Table-1. Statistic of sample description.

Item	Variable	Number of people	Percent
Gender	Male	74	58.7
	Female	52	41.3
Age	20-30	76	60.3
	30-40	36	28.6
	40-50	14	11.1
Education Background	Diploma	72	57.1
	Bachelor	38	30.2
	Master	16	12.7
Position	Junior	56	44.4
	Middle	50	39.7
	Senior	20	15.9

Source: Author’s desk research.

5.2. Statistical Analysis Techniques

A linear regression model is created, consisting of a number of explanatory variables, which is used to reveal the linear relationship between outcome variable and other explanatory variables. The mathematical form of a multiple linear regression model is as follows:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_px_p + \epsilon$$

In the formula, there are p explanatory variables. The change in outcome variable y is explained by two parts: 1) its expectation as a function of p explanatory variables, that is, $E(y) = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_px_p$. 2) Variation due to random disturbance represented by ϵ . $\beta_0, \beta_1, \beta_2,$ are regression coefficients. ϵ is random error. β_i

can be regarded as the average change in the outcome variable when xi is changed by one unit and other explanatory variables keep the same. Only if the relationship between the outcome and the covariate is linear, the linear regression model is suitable to reflect the statistical relationship. Usually a hypothesis testing is used to test if there is a significant relation between the outcome and the covariates. The null hypothesis H_0 : is the regression coefficient β is not significantly different from 0. When $\beta=0$, it means that the change in covariates doesn't cause change in the outcome y and there is no linear relation between x and y. Researcher can use SPSS 23 to calculate the P-value. If p-value is less than the given significance level α , researcher rejects H_0 and the regression coefficient is not zero. The relationship between the covariate and the outcome can be described by the linear regression equation. When the model fitting is improved, the test is more significant. P-value is used to judge the relationship between the covariate and the outcome.

5.3. Construct Validity Analysis

The study uses the SPSS 23 as a tool and carries out the construct validity analysis under the questionnaires. Table 3 is the results from the factor analysis of both the questionnaire items on candidate's motivation and prospective technological innovation are as follows:

Table-2. KMO and bartlett's test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.688
Bartlett's Test of Sphericity	Approx. Chi-Square	673.523
	df	105
	Sig.	.000

Source: Author's desk research from SPSS 23.

Table-3. Factors analysis testing of motivation.

	Component			
	1	2	3	4
Extrinsic1	-.105	.314	-.208	.686
Extrinsic2	.146	.020	-.063	.796
Extrinsic3	.117	.071	.150	.650
Independent1	.756	.188	.010	.166
Independent2	.629	.245	.103	.391
Independent3	.591	.152	-.354	.220
Independent4	.807	-.044	.203	-.113
Independent5	.677	.316	.290	-.066
Intrinsic1	-.008	-.087	.748	.398
Intrinsic2	.126	-.091	.781	-.215
Intrinsic3	.388	.259	.507	-.055
Family1	.023	.717	.490	.018
Family2	.342	.595	.005	.063
Family3	.131	.736	-.211	.219
Family4	.155	.753	-.039	.106

Source: Author's desk research from SPSS 23.

KMO is a measure of sampling adequacy and Bartlett Test's of Sphericity testifies whether the correlation matrix is an identity matrix. Both taken together provide a minimum standard before a factor analysis should be conducted. According to Table 2, as motivation of candidate, the KMO value is 0.688 and great than 0.5 (Kaiser, 1974; Fred, 2005). Bartlett's test of Sphericity implies suitability for factor analysis with significance level less than 0.05 (Bartlett, 1950). As shown, significance level of Bartlett's test of Sphericity is 0.00 in the table above, significance level is less than 0.05. The whole eigenvalues of four factors explains 61.811% of total variation. The

factor analysis on the motivation is appropriate in this paper. On the other hand, Table 5 is the result from factor analysis on prospective technological innovation are as follows:

Table-4. KMO and bartlett's test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.673
Bartlett's Test of Sphericity	Approx. Chi-Square 190.060
	df 21
	Sig. .000

Source: Author's Desk Research from SPSS 23.

Table-5. Factors analysis testing of prospective technological innovation

	Component	
	1	2
Radical 1	.696	.015
Radical 2	.805	.201
Radical 3	.674	.067
Radical 4	.714	.141
Incremental 1	.393	.688
Incremental 2	.065	.754
Incremental 3	.001	.774

Source: Author's desk research from SPSS 23.

Table 4 shows the obtained KMO value is 0.673, greater than 0.5 (Kaiser, 1974; Fred, 2005). Bartlett's test of Sphericity implies suitability for factor analysis with significance level less than 0.05 (Bartlett, 1950). As shown, significance level of Bartlett's test of Sphericity is 0.00 in the table above, significance level is less than 0.05. The study shows that the total eigenvalues of the two factors explained 56.605% of variance. The factor analysis on prospective technological innovation is appropriate in this paper.

5.4. Reliability Testing

Reliability is the overall consistency of a measure from same dimension in the model. As criteria of measure, Cronbach's Alpha test was carried out to estimate the reliability of the questionnaire.

Table-6. Testing of reliability statistics.

Dimension	Measure factor	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Extrinsic Reward	Extrinsic01	.511	.623
	Extrinsic02	.411	
	Extrinsic03	.614	
Independent	Independent 01	.709	.784
	Independent 02	.738	
	Independent 03	.783	
	Independent 04	.731	
	Independent 05	.738	
Intrinsic Reward	Intrinsic01	.520	.601
	Intrinsic02	.486	
	Intrinsic03	.495	
Family Security	Family 01	.660	.713
	Family 02	.683	
	Family 03	.649	
	Family 04	.680	
Radical Innovation	Radical 01	.681	.710

	Radical 02	.573	
	Radical 03	.691	
	Radical 04	.635	
Incremental Innovation	Incremental 01	.461	.627
	Incremental 02	.551	
	Incremental 03	.558	

Source: Author's desk research from SPSS 23.

Reliability testing seeks to ensure that the various items measuring the different constructs deliver consistent scores. For Cronbach's α , a minimum value of 0.70 is considered acceptable for existing scales and a value of 0.60 is seemingly appropriate for newly developed scales (Nunnally, 1978). Based on the results obtained, Table 6 shows more than 0.60 for newly developed scales, Cronbach's Alpha is within the range of Nunnally's acceptable reliability coefficient. Analysis of the item-total of the statistics shows that the reliability coefficient, after deleting a certain assessment item, is less than the reliability coefficient by including all of the items. It means the researcher should keep all of these items in the questionnaire.

5.5. Statistical Research Based on the Regression Analysis

Based on 126 effective questionnaires to test the causation and correlation between motivation of entrepreneurial candidate (independent variable) and prospective technological innovation (dependent variable) in Singapore, a linear regression would be carried out in this research.

Wu (2012) pointed out that an absolute value of the correlation coefficient is greater than or equal to 0.8 indicates that two variables are highly correlated, an absolute value of correlation coefficient 0.4 to 0.8 means that the correlation is modest, and less than or equal to 0.4 represents a low correlation.

Table-7. Multiple regression analysis (1).

Predict Variable	Incremental Innovation			
	Model 1	Model 2	Model 3	Model 4
Constant	4.330	3.542	3.071	3.608
Gender	.115	.088	.133	.079
Age	-.288*	-.191	-.211*	-.276**
Education	-.045	-.191	-.101	.056
Position	.023	-.088	.005	.066
Extrinsic	.009			
Independent		.277**		
Intrinsic			.287**	
Family Security				.266**
R	-.079	.331**	.320**	.287**
R Square	-.006	.109**	.103**	.082**
Adjust R Square	-.002	.102**	.095**	.075**
Sig F Change	.380	.000	.000	.001

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Source: Author's desk research from SPSS 23.

A conclusion of four results of the multiple regression analysis of candidate's motivation on prospective incremental innovation is given in Table 7. Model one showed the correlation with Motivation of Extrinsic Reward and Incremental Innovation. $P > 0.05$ shows that there is not significant correlation between these two items. Hypothesis 1 cannot be accepted.

Model two showed the correlation with Motivation of Independent and Incremental Innovation. $P < 0.05$ shows that there is significant correlation between these two variables. $R = 0.331$ means that there is a low positive

correlation between Motivation of Independent and Incremental Innovation and 10.2% of variance is explained by independent motivation. Hypothesis 2 is accepted.

Model three showed the correlation with Motivation of Intrinsic Reward and Incremental Innovation. $P < 0.05$ means that there is significant correlation between these two variables. $R = 0.320$ means that there is a low positive correlation between Motivation of Intrinsic Reward and Incremental Innovation and 9.5% of variance is explained by motivation of intrinsic reward. Hypothesis 3 is accepted.

Model four showed the correlation with Motivation of Family Security and Incremental Innovation. $P < 0.05$ shows that there is significant correlation between these two items. $R = 0.287$ means that there is a low positive correlation between Motivation of Family Security and Incremental Innovation and 7.5% of variance is explained by motivation of motivation of family. Hypothesis 4 is accepted.

A summary of the result of the Age on Prospective Incremental Innovation, if candidate possess the motivation of extrinsic, intrinsic or family, there is a significant correlation between the age and innovation. A negative correlation is showed that young candidate would prospect to adapt incremental innovation deeply in future career.

Table-8. Multiple regression analysis (2).

Predict Variable	Radical Innovation			
	Model 5	Model 6	Model 7	Model 8
Constant	4.454	3.671	1.642	3.884
Gender	.230	.179	.224	.184
Age	-.067	.006	.118	-.036
Education	.117	.118	.028	.136
Position	-.182	-.159	.219**	-.174
Extrinsic Independent	-.115	.134		
Intrinsic			.577**	
Family Security				.058
R	-.042	.205*	.531**	.119
R Square	.002	.042*	.282**	.014
Adjust R Square	-.006	.034*	.276**	.006
Sig F Change	.643	.021	.000	.184

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Source: Author's desk research from SPSS 23.

In Table 8, a conclusion of four results of multiple regression analysis of candidate's motivation on prospective radical innovation is given. Model five showed the correlation with Motivation of Extrinsic Reward and Prospective Radical Innovation. $P > 0.05$ shows that there is not significant correlation between these two variables. Hypothesis 5 cannot be accepted.

Model six showed the correlation with Motivation of Independent and Radical Innovation. $P < 0.05$ shows that there is significant correlation between these two variables. $R = 0.205$ means that there is a very slight positive correlation between independent motivation and radical innovation and 3.4% of variance is explained by independent. Hypothesis 6 is accepted.

Model seven showed the correlation with Motivation of Intrinsic Reward and Radical Innovation. $P < 0.05$ shows that there is significant correlation between these two variables. $R = 0.531$ means that there is a moderate positive correlation between intrinsic reward and radical innovation and 27.6% of variance is explained by intrinsic. Hypothesis 7 is accepted.

Model eight showed the correlation with Motivation of Family Security and Radical innovation. $P > 0.05$ shows that there is not significant correlation between these two items. Hypothesis 8 cannot be accepted.

A summary of the research model and accepted hypotheses are as follow.

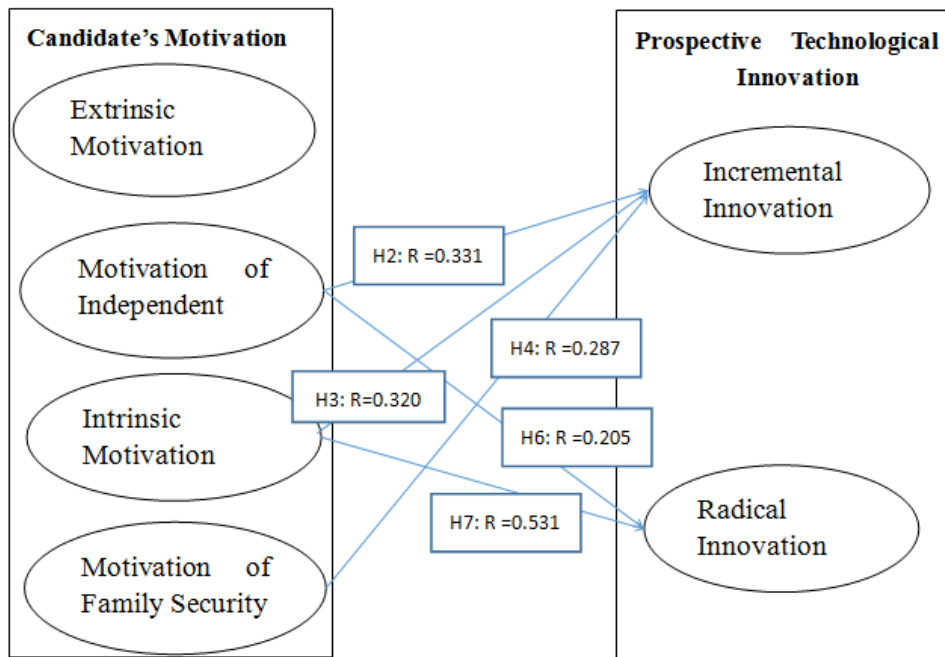


Figure-2. Conclusion of hypotheses in research model.

Source: Author's Desk Research.

6. CONCLUSIONS

According to the results of implementation research in Figure 2, Researcher summarized conclusion as below.

6.1. Relationship between Extrinsic Motivation and Prospective Technological Innovation

There hasn't any correlation between motivation of extrinsic reward and prospective technological innovation. Entrepreneurial candidate who possess the motivation of extrinsic reward would like to pursue money or shares in the future. To increase their wealth, they want to earn the money whatever use innovative way or not. They also don't like to spend the money for research and development to realize the technological innovation. The first choice to them is how to make more money no longer time.

6.2. Relationship between Motivation of Independent and Prospective Technological Innovation

Motivation of independent has low positive correlation with prospective incremental innovation and slight positive correlation with prospective radical innovation. The kinds of candidates who possess independent traits tend to desire the personal freedom and they do not want to be constrained. They want to control their own career development and make self-decisions. To pursue independent, they could find out more opportunities if pay attention to the technological innovation. Because of safety, they also think incremental innovation is better than radical innovation. Therefore, incremental innovation is the first choice around the innovative fields.

6.3. Relationship between Intrinsic Motivation and Prospective Technological Innovation

Candidates who possess intrinsic reward tend to pursue non-physical needs. For example, rights control, honor and sense of accomplishment and so on. Their entrepreneurial motivation doesn't tend to pursue money, wealth and family security. They generally regard the social recognition, personal growth and thinking of career as

responsibility. They think entrepreneurship risks exist at any time. More innovations mean more opportunities. They usually possess regular operation fields in their business. They tend to desire technology and competition. These kinds of candidates have moderate positive correlation with radical innovation and low positive correlation with incremental innovation. The candidates prefer to use the technological innovation to realize the business. Although the risk of radical innovation is more than incremental, the kind of candidates think radical innovation will also make more opportunities. They tend to use radical innovation to start their entrepreneurship.

6.4. Relationship between Motivation of Family Security and Prospective Technological Innovation

There is low positive correlation between the candidates who possess family security and incremental innovation, and none correlation between motivation and radical innovation. The candidate tends to pursue good family conditions. Caring about the future of their families and members is very important to them. It shows family security is normally pursues steady and obtain a stable revenues. They need innovation to change their future. However, they don't like to reform their innovation radically. Contrasting with radical innovation, they think the incremental innovation is steady and safety.

The biggest limitation of this study would be the complicated and diverse entrepreneurial environment. Other than motivation, a plethora of external environmental factors might affect technological innovation. The next is the study only focuses on candidate's motivation and prospective technological innovation. Further research needs to look into how other factors can influence technological innovation, and results of the prospective innovation.

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