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EFFECTS OF ENTREPRENEURIAL BEHAVIORS AND PRODUCT INNOVATION PERFORMANCE TOWARDS START-UP BUSINESS SURVIVAL IN THAILAND

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Abstract

This research aims to: 1) study the magnitude of the effects of entrepreneurial behaviors towards start-up business survival in Thailand and 2) study the magnitude of product innovation performance towards start-up survival in Thailand. The target groups are among founders of start-up businesses in Thailand. The questionnaire was used as a tool for collecting data. Data were analyzed by quantitative analytical methods including mean, standard deviation, and using binary logistic regression modeling. The results indicated that finding and refining the opportunity was the highest, followed by identifying and selling to customers, operating the business, strategic performance, customer performance and outside of the business. Moreover, it was found that acquiring resources and help, market performance and financial performance contributed a positive impact on start-up survival in Thailand.

Keywords: Entrepreneurial Behavior, Product Innovation Performance, Startup, Business Survival

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Introduction

Startup businesses are the foundation of Thailand's future economy, which is being closely watched by all sectors because of the simplicity of beginning with a new business. The initial investment is not prohibitively expensive. Technology and possible innovations are used as the foundation for business development. The process is intended to be endlessly repeatable and expandable. As a result, Startup businesses have a high economic value and the potential to grow rapidly.

Startups are also focused on solving problems by developing products or services that can meet needs and provide value to users. They also provide a low-cost replicable business model and operations, as well as the ability to rapidly expand their market into a wider area. These aspects allow start-ups to address issues where traditional systems or business models fail to provide true value to users. Startups improve the quality of life of users providing faster services or lower prices.

When compared to other countries, Thailand's startups were found to have an average potential when compared to the world. Thailand's environment and ecosystem are not conducive to startup development, ranking slightly above the ASEAN region average (Ács et al., 2016). As a result, Thai startups have been unable to reach their full potential. As a result, the number of high-quality, appealing startups is limited as reported in the (Thai Venture Capital Association, 2016).

Therefore, in order to reduce the risk factors that may result in the failure of startup enterprises in the future, as well as to research and discover ways to survive the start-up business, research was conducted on startup business survival forecasting. Gartner has established four hypotheses and research subjects that will be used to study and predict business survival as follows: 1) Personal Characteristics 2) Entrepreneurial Behaviors, 3) Strategy, and 4) Environment. Entrepreneurial behavior is the subject of this study. Entrepreneurial behavior is the most important predictor of a company's survival (Gartner, 1988).

Product innovation performance is another critical factor in determining a company's survival in today's highly competitive environment. And the old way of doing business is no longer working. What steps do you need to take to ensure your company's survival in a highly competitive market? One of the strategies that has been raised as a global issue is the use of new processes and innovative products (Calantone et al., 2002; Tohidi & Jabbari, 2012). The innovation management plan is no longer sufficient. It must be accompanied by innovations capable of producing products that are both practical and beneficial to businesses. Increasing the return on investment in innovative products, organizations or entrepreneurs must manage, control, and measure the development of new products from the start of development, strategy, and development initiatives through the innovation development process. They need to utilize innovative products that can help solve problems for the organization, such as enabling organizations to operate with greater automation and efficiency and that these products are worth the cost of development investment (Tohidi & Jabbari, 2012).

To be able to build a business in order to survive or succeed there are numerous components. The research that predicts the survival of start-ups includes analyzing various dimensions of the organization. Gartner (1988) has identified four key factors for business success: 1) Individual characteristics 2) Entrepreneurial behavior 3) Strategy and 4) Environment, all of which are important for consideration. The researcher chose to study entrepreneurial behavior because he saw this dimension as the most important factor influencing business survival. According to the findings of the study, the researcher wanted to investigate the relationship between entrepreneurial behavior and the survival of start-up businesses in Thailand and to investigate the relationship between the performance of the innovative product and its survival as a Thai startup business.

Literature Review

Entrepreneurship is a skill that describes a willingness to face uncertainty. Struggling to stay in business, including the thought process, behavior, and action guidelines for entrepreneurs, is a skill that can be learned and honed (Kao, 1989). According to Burnett's (2000) study, entrepreneurs must have the opportunity and willingness to become entrepreneurs in order to truly become entrepreneurs.

Entrepreneurial behavior refers to the activities that entrepreneurs engage in while running their businesses. These actions are related to the perception of opportunity and the establishment of businesses to capitalize on opportunities (Hofer & Bygrave, 1992) in order to achieve desired goals (Delmar, 1996) and it is a description that focuses on what entrepreneurs do (Gartner, 1988). Here, we would like to define entrepreneurial behavior, which can be divided into two dimensions: (1) Entrepreneurial characteristics in which entrepreneurs are described in terms of personal characteristics or personalities and includes aspects such as creativity (Reid, 1993), risk-taking (Carland et al., 1984; McClelland, 1965; Palmer, 1971), vision (Kao, 1989), opportunity seeking (Misumi & Peterson, 1985; Shane & Venkataraman, 2001), and motivation (Delmar, 1996) and (2) entrepreneurial conduct which is an explanation that focuses on what entrepreneurs do rather than figuring out what they do.

Start-ups are enterprises with high growth and not more than five years old, according to Steve Blank's (2010) study which defined startup enterprises as organizations established to find business models that can be repeated and grown exponentially. Eric Ries further defined start-up enterprises as organizations that strive to create new products or services in an environment of uncertainty (Ries, n.d.). Startups, as defined by Paul Graham, founder of the venture capital firm YCombinator, are: "a company designed to grow rapidly." Growth is the only thing that matters; everything else about startups will follow suit (Graham, 2012). High-growth businesses which includes all enterprises with a three-year average annual growth rate of more than 20%, should be considered high-growth enterprises, where growth is measurable by the number of employees (Organisation for Economic Co-operation and Development, 2007).

Product innovation performance is a broad conceptual scope for achieving innovative product performance. Businesses must comprehend the dynamics of innovation and innovative strategy, which includes implementation strategies. Above all, Product Innovation Performance is a device used to assess the performance of innovative products (Hannachi, 2015). The performance of innovative products is a structure that represents two distinct aspects of a business: operational effectiveness of innovative products. An innovative product's operational efficiency reflects its level of innovation, whereas an innovative product's operational efficiency can reflect its efforts to achieve innovation. Success (Alegre et al., 2006; Hannachi, 2015) categorizes innovative product performance into five categories: (1) financial performance, (2) marketing performance, (3) customer performance, (4) technical operations performance, and (5) strategic performance. Profitability and business survival are the goals of innovative products. Financial performance is the most used criterion for evaluating performance. and marketing performance, including strategic performance (Suomala, 2004).

Business viability is defined as the ability of a company to generate revenue after the third year of operation (Smith, 2007). New businesses fail at a high rate, with 50% of startups failing (Vesper, 1990). The first three to five years (GMAP, 2007; Griffin & Page, 1996; Janáková, 2015) are when most businesses fail. Start-up businesses are frequently under intense pressure to survive and grow (Nicholls-Nixon, 2005) particularly with rapidly growing technology start-ups (Kazanjian & Drazin, 1990). Many factors influence a business's viability, including the nature of the market (Audretsch, 1995; Thompson, 2005), the life cycle of an industry the size and age of the organization (Ortiz-Villajos & Sotoca, 2018), profitability and financial constraints.

Hypothesis 1: Entrepreneurial behavior influences startup survival in Thailand (H1).

Hypothesis 2: Product innovation performance has a causal impact on startup in Thailand (H2).

Conceptual Framework

Reviewing concepts and research related to Entrepreneurial Behaviors revealed that most of the research done with business abroad It is interesting to note that any factor or element has influenced the survival of new businesses in Thailand. There is also research on Product Innovation Performance that can be used as a survival indicator. Including business growth, which can be used as an indicator and test how to influence the survival of the initial enterprises in Thailand, and entrepreneurs starting in Thailand should pay attention and focus on what factors, and when bringing all the components and variables to summarize as a research concept. The Concept Framework is depicted in Figure 1.

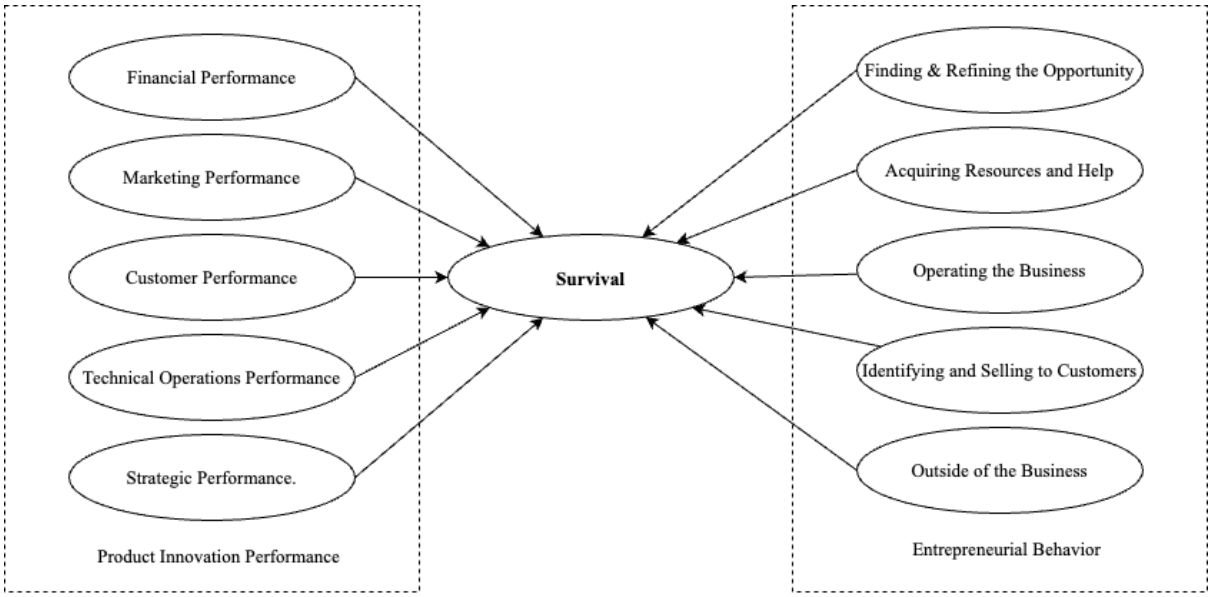

Figure 1 Conceptual Framework

Research Methodology

The study sample consisted of entrepreneurs from the Startup Ecosystem database of the National Innovation Agency, totaling 352 enterprises (National Innovation Agency, 2021). A total of 344 enterprises less than 10 years old were selected and examined. Of those, 287 businesses were still in operation and could be contacted. To analyze the collected data, the researchers used a logistic regression analysis, which determined the sample size according to the rule of thumb of at least 20 samples per component (Bentler, 2006) with 10 components thus demanding a sample size of least 200.

Out of a total of 287 samples were sent out, 52 entrepreneurs responded to the questionnaire, giving a sample size (n) that is too small for the regression analysis, which needed at least 200 samples according to the law of clarity. As stated earlier, a sample size of 10-20 per variable should be used (Van Voorhis & Morgan, 2007). For this study, the bootstrap method was chosen to estimate parameters using re-sampling which gave a new sample group size. The data could then be imported into the model to find the factors affecting the survival of start-up businesses in Thailand.

The data collection tool used in this study was a questionnaire which was divided into four sections as follows: Part 1 Startup Enterprise General Information This section included the respondents' general information such as the business name, year of establishment, type of business, revenue growth, the number of employees in the company, and the business model. It's an open-ended question for a business name. And it is a closed-ended question for the year the business was founded. business revenue growth number of employees in the business and

a checklist for the type of business. Part 2 Entrepreneurial Behavior Questionnaire. The questionnaire in this section is divided into five parts as follows: 1) Finding & Refining the Opportunity 2) Acquiring Resources and Help 3) Operating the Business 4) Identifying and Selling to Customers 5) Outside of the Business. All the items were scored using a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Part 3 Product Innovation Performance Questionnaire. Create a questionnaire to measure the performance of innovative products of startup enterprises. All the items were scored using a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 1 Types of Questions of Innovation Product Performance and Sources

The question	**Modified from**
Financial Performance	Blindenbach-Driessen et al. (2010); Griffin & Page (1996); Hsu & Fang (2009); Storey & Easingwood (1999)
Marketing Performance	Hsu & Fang (2009)
Technical Performance	Griffin & Page (1996)
Customer Performance	Blindenbach-Driessen et al. (2010); Griffin & Page (1996); Hsu & Fang (2009)
Strategic Performance	Griffin & Page (1996)

Part 4 Additional Suggestions. There is an open-ended question on the questionnaire to allow the sample to independently express opinions including suggestions about research or additional information.

In the process of creating a research tool for inquiring about startup entrepreneurs, these are the steps that were followed: 1) Collection of literature and research concepts on entrepreneurship, entrepreneurial behavior, start-up enterprises, innovation, performance of innovative products, Startup Enterprise Survival Theory and related research; 2) A draft questionnaire derived from the questionnaire developed by Gartner et al. (1999) on the analysis of entrepreneurial behavior and questionnaires analyzing the performance of innovative products based on research by Alegre et al. (2006); Blindenbach-Driessen et al. (2010); Griffin & Page (1996); Hannachi (2015); Hsu & Fang (2009); and Storey & Easingwood (1999) 3) The generated questionnaire was used by five experts to test the reliability and Item-Objective Congruence (IOC) of the questions, and the results revealed that the questions were reliable and can be used in the study. The IOC value of entrepreneurial behavior factor and performance of innovative products with Cronbach's Alpha coefficient was greater than 0.70 (Hair et al., 2010). All questions were greater than the criterion of 0.50 (Rovinelli & Hambleton, 1977). The tool was considered to have the validity of the questionnaire. 4) The structure was examined using Confirmatory Factor Analysis (CFA) to examine the structure of the components of any variables. The question, “How much weight or ratio is there in relation to the composition?” was analyzed to see if the factor corresponds to the model. According to the findings of the investigation, the values met the criteria for both the entrepreneurial behavior model and the performance model of innovative products.

This study was approved by the ethics committee of Suranaree University of Technology before gathering the research data. The approval number is EC-63-92.

Research Results

The researcher used descriptive statistics to describe the properties or nature of the distribution of variable data according to factors affecting business operations. It is expressed as a percentage (%), an arithmetic mean, and a standard deviation. Table 2 shows a profile of the sample and Table 3 shows comparative information on opinions on entrepreneurial behavior and performance of innovative products.

Table 2 Descriptive statistic profile of participants

Data	Group	Frequency	%
Business Growth	Yes	34	65.38%
	No	18	34.62%
	Total	**52**	**100.00%**
Business Age	Less than 3 years	32	61.54%
	3-10 years	20	38.46%
	Total	**52**	**100.00%**
Number of employees	1-9 people	39	75.00%
	10-49 people	12	23.08%
	50-250 people	1	1.92%
	Total	**52**	**100.00%**
Business model	Business to Consumer	23	44.23%
	Business to Business	24	46.15%
	Business to Government	2	3.85%
	Business to Business to Consumer	3	5.77%
	Total	**52**	**100.00%**

Table 3 Comparative information on opinions on entrepreneurial behavior and performance of innovative products

Group	Frequency	%
Business Survival Conditions		
Revenue grows more than 20% per year and is less than 3 years old.	21	40.38%
Revenue grows more than 20% per year and has a business life of 3-10 years.	13	25.00%
Yes	**34**	**65.38%**
Revenue grows more than 20% per year and is less than 3 years old.	11	21.15%
Revenue grows more than 20% per year and has a business life of 3-10 years.	7	13.46%
No	**18**	**34.62%**
Total	**52**	**100.00%**

Result of Confirmatory Factor Analysis

This section presents the findings of a Confirmatory Factor Analysis of factors influencing entrepreneurship and the performance of innovative startup products to demonstrate the validity of the questionnaire's variable elements. Demonstrating validity will indicate whether it is appropriate to use elemental analysis, measuring the suitability and distribution of data using KMO and Bartlett's methods, multicollinearity, correlation analysis, and convergent validity.

The KMO (Kaiser-Meyer-Olkin) method is used to determine suitability. With a value of 0.632, greater than 0.50, it is possible to conclude that the available data is appropriate for using the Factor Analysis technique.

The multilinear convergence, considering tolerance, was between 0.401 to 0.948, with the lowest value being the financial performance variable (0.401) and the highest being other than business operations (0.948). The VIF value ranged from 1.482 to 2.494, with the lowest being technical performance (1.482) and the highest being financial performance (2.494). The studied variables were within acceptable criteria, indicating that the observed variables studied this time did not have poly-linearity problems.

Correlation analysis revealed that all pairs of variables were significantly related at the .01 level, with most of them having a correlation level of less than 0.7, even though each variable was independent (Baggio & Klobas, 2011) with a correlation coefficient ranging from -0.128 to 0.429. The following variables were discovered to be highly inversely related: Survival and business place (EB OPE) -0.004 versus Technical Performance (PIP TEC) and Customer Performance (PIP CUS) at -0.029 and -0.069, respectively. Customer and Sales Performance (EB IDN) versus Financial Performance (PIP FIN), Marketing Performance (PIP MAR), and Strategy Performance (PIP STR) at -0.029, -0.004, and -0.040, respectively. The presence of a positive value indicates that the two variables are positively related.

Parameter evaluation, based on convergent validity, can be measured using four items: (1) Factor Loading gave a value between 0.604 to 0.741 from the criteria of Hair et al. (2010) which requires a component weight value of 0.5 or greater (Minimum acceptable value). (2) The Average Variance Extracted (AVE) indicated that entrepreneurial behavior had a value of 0.525 and innovative product performance had a value of 0.553, both of which were greater than 0.5, which was set as an acceptable criterion (Hair et al., 2010) indicating that there is no measurement error causing variation in the observed variables which means quality measurements were achieved with a high level of precision. (3) The Construct Reliability (CR) of latent variables revealed that entrepreneurial behavior had a value of 0.952 and performance of innovative products had a value of 0.951, both of which were within the acceptable criteria (Hair et al., 2010). (4) Discriminant Validity discovered that the correlation between the variables ranged from -0.128 to 0.430, indicating that all variables had discriminant validity at the appropriate level (Kline, 2016). Alternatively, each variable was not highly correlated.

Confirmatory component analysis results of factors influencing entrepreneurship and the performance of startup businesses' innovative products indicated that entrepreneurial behavior was beneficial. The chi-square statistical value (Chi-square: x2) was 5.967, the p-value was 0.309, at degree of freedom (df) equal to 5, which has a level of statistical significance greater than the criteria considered equal to 0.05. Standardized Root Mean Square Residual (SRMR), of 0.032, which is less than 0.05. Furthermore, the Comparative Fit Index (CFI) had a value of 0.991, which meets the criteria because it is greater than 0.90. As a result, every variable in this entrepreneurial behavior group is statistically significant. Because these variables are independent, they can be used in logistic regression analysis. As for the performance of innovative products, it was found that the fit of the model had a Chi-square: x2 statistical value of 8.930, a level of statistical significance (p) of 0.112 with a degree of freedom (df) equal to 5, which has a level of statistical significance greater than the criteria considered equal to 0.05. The Standardized Root Mean Square Residual (SRMR) equaled 0.032, which met the consideration criteria of being less than 0.05. Furthermore, the Comparative Fit Index (CFI) had a value of 0.982, which met the consideration criteria. This value must be greater than 0.90. As a result, we can conclude that it is statistically significant. All variables in the performance of innovative products are self-contained. As a result, these variables can be incorporated into logistic regression analysis.

Table 4 Confirmatory component analysis

Item	Revenue grows more than 20% per year				Revenue grows less than 20 % per year			
	x	**S.D.**	**Level**	**Rating**	**x**	**S.D.**	**Level**	**Rating**
Entrepreneurial Behaviors								
Finding & Refining the Opportunity	4.32	0.73	High	1	4.33	0.82	High	1
Acquiring Resources and Help	3.25	1.35	Medium	10	3.03	1.21	Medium	7
Operating the Business	4.08	0.85	High	5	4.04	0.84	High	2
Identifying and Selling to Customers	4.26	0.85	High	3	4.01	0.95	High	3
Outside of the Business	3.64	0.92	High	6	3.69	0.89	High	5
Total	**3.91**	**0.94**	**High**		**3.82**	**0.94**	**High**	
Product Innovation Performance								
Financial Performance	3.60	0.85	High	7	2.93	1.04	Medium	8
Marketing Performance	3.31	1.07	Medium	9	2.80	0.96	Medium	9
Technical Performance	3.52	0.88	High	8	2.72	0.93	Medium	10
Customer Performance	4.19	0.68	High	4	3.70	0.77	High	4
Strategic Performance	4.27	0.71	High	2	3.57	1.09	High	6
Total	**3.78**	**0.84**	**High**		**3.15**	**0.96**	**Medium**	

Result of Logistic Regression

In analyzing the behavioral factors of entrepreneurs on the success of startups in Thailand, the relationship between the dependent and independent variables was analyzed. Binary Logistic Regression was used, which has two dependent variables, 0 and 1. In this model, 1 means a business with an average annual revenue growth of more than or equal to 20% and 0 refers to a business that does not have an average annual revenue growth of more than or equal to 20%. The equation can be written as follows.

$$SURVIVAL_{yes} = \frac{e^{fa}}{1 + e^{fa}}$$

$$SURVIVAL_{no} = 1 - SURVIVAL_{yes}$$

When $SURVIVAL_{yes}$ = Probability of Business Survival

$SURVIVAL_{no}$ = Probability of Failed Business

fa = Factors Affecting Business Success

e = Exponential Function (2.71828)

In developing a business survival model, there are two options that can be written using the following equations:

Model 1 considers only the operating results variables.

$$fa = \beta_0 + \beta_1 EB\_OPP + \beta_2 EB\_RES + \beta_3 EB3EB\_OPE + \beta_4 EB\_IDN + \beta_5 EB\_OTH$$

Model 2 considers only operational variables.

$$fa = \beta_0 + \beta_1 PIP\_FIN + \beta_2 PIP\_MAR + \beta_3 PIP\_TEC + \beta_4 PIP\_CUS + \beta_5 PIP\_STR$$

The researcher used a normal model with n sample groups multiplied by 52. Because the sample size was too small, no variables were found to be statistically significant (P-value > 0.05). In order for the sample size to be appropriate for statistical regression analysis, there should be at least 100 samples. If there are only two variables, 100 samples (N = 10*P) may be sufficient. There are 10 variables in this study. As a result, the researcher applied the rule of thumb to determine the size of the new sample. The law of clarity proposed using a sample size of 10-20 per variable (Van Voorhis & Morgan, 2007), resulting in a new sample size of 200 samples (N = 10*20). The parameters were estimated using the Bootstrap method, which is more appropriate for ranged data than the Jackknifing Method (Chanrungmaneekul, 2003) and the newly obtained samples were used to import a model to identify factors influencing startup survival in Thailand. The procedure was divided into two parts: 1) results of Bootstrap estimation and 2) results of Binary Logistic Regression model development.

Estimation Results by Bootstrap Method

Bootstrap estimation is a technique for estimating parameters that employ repeated sampling, generating a new sample from an existing random sample (Efron, 1980) proposed the Resampling with Replacement method, which uses a return sampling of magnitude n from a single random sample. To generate a sample set of n possible sizes, instead of directly sampling the population with the distribution function, sampling from the sampled data's empirical distribution function is used. The following is the calculation formula:

$$\hat{\theta}_B = \frac{\Sigma_{i=1}^{B} \hat{\theta}_i^*}{B}$$

Estimation of Parameter θ by Bootstrap Method At the significance level α, then

$$P\left(\hat{\theta}_{BL} < \theta < \hat{\theta}_{BU}\right) = 1 - \alpha$$

which is determined from the variable distribution of the obtained bootstrap values $\hat{\theta}_i^*$, arranged in descending order. Then calculate the value at the 100$(\alpha/2)$ percentile position $\hat{\theta}_{BL}$ and at the 100 $(1-\alpha/2)$ assign $\hat{\theta}_{BU}$. Confidence interval $(1-\alpha)$ 100% is obtained by bootstrapping method [$\hat{\theta}_{BL}$, $\hat{\theta}_{BU}$].

The Confidence Coefficient calculated from each estimation method were used to compare whether the confidence intervals calculated from each estimation method covered the parameters or not. In each round, the number was counted if the calculated confidence intervals covered the parameters. The confidence coefficient was calculated by adding times and cumulative values as follows:

$$Confidence\ Coefficient = \frac{The\ total\ number\ of\ times\ that\ confidence\ covers\ the\ \theta parameter}{M}$$

In this case, M is the number of cycles that are repeated in each scenario. According to the Rule of Thumb, it was proposed to use a sample size of 10-20 per variable. In this research, there were 10 observed variables and thus M = 10**.** Therefore, the new sample size was set to 10**x**20 = 200 samples with bootstrap estimation results, arithmetic mean, standard deviation, Mean Square Error: MSE, and standardized coefficients all used to prove that the samples can be used for interval estimation using the bootstrap method. That gives a set of 200 samples that were entered into the regression model as shown in Table 5.

Table 5 Comparison of Bootstrap Estimation Results

Factor	Estimate (β)	SE	Z-value	S.D.	P-value
Entrepreneurial Behaviors					
Finding & Refining the Opportunity	1.647	1.103	1.493	0.276	0.135
Acquiring Resources and Help	20.733	4.353	4.763	0.846	0.000
Operating the Business	6.973	1.520	4.589	0.769	0.000
Identifying and Selling to Customers	3.095	1.012	3.058	0.488	0.002
Outside of the Business	16.190	3.244	4.990	0.992	0.000
P-value (Chi-square) = 0.309, df = 5, P-value = 0.000, CFI = 0.911, TLI = 0.773, RMSEA = 0.141, SRMR = 0.032					
Product Innovation Performance					
Financial Performance	2.022	0.595	3.399	0.343	0.010
Marketing Performance	5.505	1.460	3.772	0.405	0.000
Technical Performance	4.078	0.891	4.576	0.657	0.000
Customer Performance	1.948	0.482	4.037	0.463	0.000
Strategic Performance	3.389	0.840	4.034	0.462	0.000
P-value (Chi-square) = 8.930, df = 5, P-value = 0.112, CFI = 0.982, TLI = 0.964, RMSEA = 0.062, SRMR = 0.032					

From re-sampling parameter estimates using the creation of a new sample from an existing random sample in the Resampling with Replacement, it was found that a sample size of 200 samples showed a similar arithmetic mean between -0.460 to 0.181. Likewise, the Standard Deviations were similar, between -0.155 to 0.603. In addition, the MSE were also close, between -0.867 to 1.459. The Standardized Coefficients found no negative values. Therefore, it can be concluded that this new sample can be further analyzed for statistical modeling results.

Results of Model Development with Binary Regression

1) The business survival model considers only entrepreneurial behavior variables: In testing the suitability of the model (Goodness of fit), it was found that in considering the likelihood value, there was a value of -2Log likelihood equal to 124.887 and if considering the Hosmer and Lemeshow Test statistics for checking the suitability of the model, the model has a Chi-square = 6.186 and a p-value = 0.289 ($p > 0.05$), which is greater than 0.05, that is, at the 95% confidence level. Thus, the hypothesis is not rejected, indicating that the logistic regression equation of the model is appropriate. If considering the predictive coefficient (Coefficient of Determination: R^2), the statistics for testing the correlation level from Cox & Snell and Nagelkerke's R^2 found that there was a Nagelkerke $R^2 = 0.063$, which explains 6.3% of the variation by logistics equation. Estimating the accuracy of the model from the percent of correct forecasts equals 90.2, indicating that the model can predict the survival of the business from the operating results correctly at 90.2% as shown in Table 6.

Table 6 Business survival model from Entrepreneurial Behavior

Factor	N = 52				N = 200			
	$\bar{x}$	S.D.	MES	B	$\bar{x}$	S.D.	MES	B
Entrepreneurial Behaviors								
Finding & Refining the Opportunity	4.296	2.429	2.515	-0.094	4.314	2.099	3.195	0.058
Acquiring Resources and Help	3.173	5.220	4.937	0.021	3.219	4.618	3.885	0.127
Operating the Business	4.069	3.009	3.115	0.206	3.888	2.512	2.959	0.039
Identifying and Selling to Customers	4.178	2.585	2.506	-0.002	4.073	2.195	3.011	0.033
Outside of the Business	3.659	4.009	4.009	-0.222	3.548	3.514	2.550	0.068
Product Innovation Performance								
Financial Performance	3.365	2.483	2.475	0.390	3.433	2.336	3.050	0.181
Marketing Performance	3.131	3.732	3.799	-0.071	3.148	3.887	4.221	0.189
Technical Performance	3.244	2.470	2.466	-0.010	3.703	2.253	2.747	0.111
Customer Performance	4.019	2.072	2.032	0.243	4.102	1.795	2.899	0.101
Strategic Performance	4.032	2.715	2.747	0.146	4.125	2.274	2.734	0.071

It was found that the Acquiring Resources and Help factor (EB_RES) had a statistically significant influence on the business performance at the 0.05 level, with an estimated value of the independent variable (Estimate: β) having a value equal to 0.127 ($p = 0.0240$) according to research hypothesis number 1 (H1).

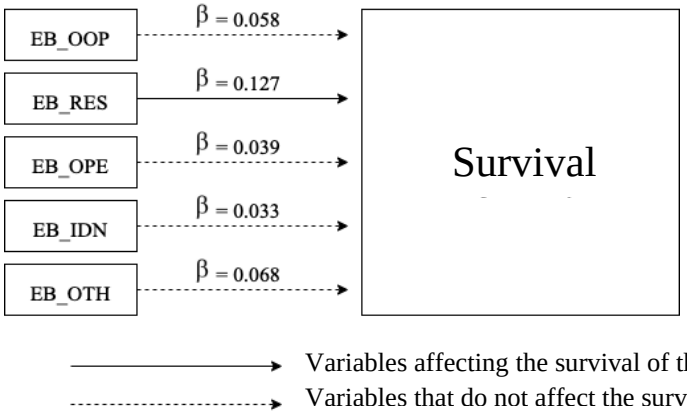

Figure 2 Entrepreneurial Behavior Factors that affect the survival of startup businesses in Thailand

2) Business survival model consider only the product innovation performance variable: Using the Business survival model, only the performance variable in the goodness of fit test found that in considering the likelihood value, there was -2 Log likelihood equal to 119.016 and if considering Hosmer-Lemeshow test statistics for checking the suitability of the model has a

Chi-square = 12.057 p-value = 0.034 ($p > 0.05$), which is greater than 0.05, that is, at a 95% confidence level, the hypothesis is not rejected. This shows that the logistic regression equation of this model is suitable. If the Coefficient of Determination (R^2), Cox & Snell and Nagelkerke's R^2 statistic, found that there was a Nagelkerke $R^2 = 0.121$, that is, 12.1% of the variance is explained by the logistics equation. Assessing the accuracy of the model from the percent of correct forecasts gave a value of 90.7, indicating that the model was able to predict the survival of the business from the operating results correctly at 90.7% as shown in Table 7.

Table 7 Business survival model from the Product Innovation Performance

-2Loglikelihood	**Cox & Snell R2**	**Nagelkerke R^2**	**Percentage Correct**	**N**
119.016	0.057	0.121	90.7	200
Factor	**Estimate (β)**	**SE**	**z value**	**P-value**
Entrepreneurial Behaviors				
Finding & Refining the Opportunity	0.058	0.076	0.755	0.4500
Acquiring Resources and Help	0.127	0.056	2.260	0.0240*
Operating the Business	0.039	0.072	0.540	0.5890
Identifying and Selling to Customers	0.033	0.076	0.430	0.6670
Outside of the Business	0.068	0.073	0.934	0.3500

***** Means a level of statistical significance at 0.05
****** Means a level of statistical significance at 0.01

It was found that there are two factors that affect the survival of the business in terms of performance, namely, the marketing performance factor (PIP_MAR) which has a statistically significant influence at the 0.01 level estimated by the independent variable (Estimate: β) at 0.189 ($p = 0.00155$) and the financial performance (PIP_FIN) had a statistically significant influence on business performance at the 0.05 level estimated by the independent variable (Estimate: β) at 0.181 ($p = 0.0208$) according to hypothesis number 2 (H2) of the research.

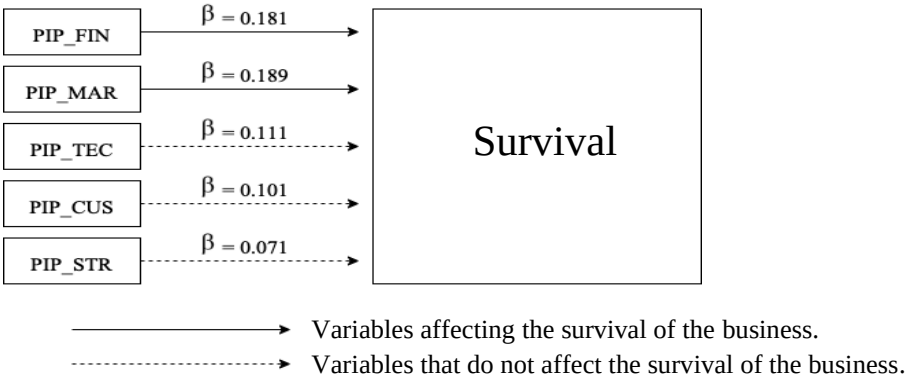

Figure 3 Entrepreneurial Behavior that affect the survival of startup businesses in Thailand

From the development of both models, when considering the goodness of fit test, likelihood value, -2Log likelihood, and the Hosmer and Lemeshow Test statistics, it was found that all models of logistic regression equations are suitable and the coefficient of determination (R^2), Model 1 had a value of 0.063 and Model 2 had a value of 0.121. Model 1 was 90.2 and Model 2 was 90.7. Therefore, considering the results of the development of the two models mentioned above, Therefore, it can be concluded that both models are suitable for explaining the factors affecting the survival of startups. Whereas Model 2 was able to predict better than Model 1 because it had a higher forecasting coefficient and percentage of forecasting.

Conclusion and Discussion

The results of the development of both business survival models, which are analyzes of factors affecting business operations and operations. which is a binary logistic regression analytic model (Binary Logistic Regression) showing the results of each model as follows: (Entrepreneurial Behaviors) It was found that 1 factor affecting business operations, namely, seeking resources and assistance (EB_RES), had a statistically significant influence on business performance at the 0.05 level, estimated by independent variables. Estimate that is equal to 0.127 (p = 0.0240) As for the performance, there are two factors that affect the survival of the business in terms of performance, namely, the marketing performance (PIP_MAR) has a statistically significant influence at the level 0.01 by the estimate of the independent variable (Estimate) is equal to 0.189 (p = 0.00155) and Financial performance (PIP_FIN) has a statistically significant influence on business performance at the level of 0.05 with an estimate of the independent variable (Estimate) of 0.181 (p = 0.0208).

From the development of both models, when considering the goodness of fit test, likelihood value, -2Log likelihood, and the Hosmer and Lemeshow Test statistics, it was found that all models of logistic regression equations were suitable. The coefficient of determination (R^2) gave Model 1 a value of 0.063 and Model 2 a value of 0.121, that Model 1 percent of correct forecasts gave a value is 90.2 and Model 2 is 90.7. Therefore, considering the results of the development of the two models mentioned above, it can be concluded that both models are appropriate to describe the factors affecting the survival of startups. Model 2 was better at predicting than Model 1 because it had a higher forecasting coefficient and a higher percentage of forecasting.

Application of Research Findings in Practice

1) Emphasizing business networks, experts, or related individuals (stakeholders): According to the research findings on resource acquisition and assistance (EB RES) that influence enterprise survival significantly at the level of 0.05, with the estimated value of the independent variable (Estimate) being 0.127 (p = 0.0240), start-up entrepreneurs should pay more attention to business networks, especially because they can assist with funding. It is important to know an independent investor (Angel investor) or a person or organization that run a venture capital business in order to start a business. During product development, market testing, or when the business has not yet broken even, the most dangerous point in the survival of a startup business, there is the possibility of receiving assistance from a network of experts or people in the same industry who can help find customers or solve technical problems. This is consistent with the resource acquisition and support factors that have a positive impact on the viability of Thai start-up businesses.

2) Focus on financial management: According to the findings of the research on financial performance (PIP FIN), it influences enterprise survival significantly at the 0.05 level, with an estimate of the independent variable of 0.181 (p = 0.0208). Entrepreneurs should regularly plan financial and process and product development plans to eliminate unnecessary things in the process or reduce waste in the process to reduce costs and increase business profits Because financial factors have a direct impact on the survival of any business.

3) Attention to marketing and market demand: The most common cause of failure among start-ups is the lack of marketable goods or services, at 42 percent (CB Insights, 2018). Including research showing that marketing performance (PIP_MAR) has a significant influence on survival at the 0.01 level, with the estimate of the independent variable being 0.189 ($p = 0.00155$). This is why entrepreneurs need to check the market demand before starting to invest in product development or service to prevent risk factors in the development of things that do not need to go to the market, so it does not generate income. Including the factor in making products and services reach the groups of customers who are likely to want the product or service is another thing that entrepreneurs should pay attention to, and this will be more successful. When entrepreneurs can start from the right customer group before starting or during market research which those activities It will help the business to generate higher sales and may result in a higher market share than competitors. This factor affects market performance, which is a variable that significantly affects the survival of start-up enterprises in Thailand.

Application of Policy Findings

1) Policy to encourage investment in new businesses: The findings for resources and assistance (EB_RES) factors significantly affect survival according to the findings. There is an internal component of alliance building and financial, legal, technical support to the business, where policy support can be achieved by having a business matching agency between independent investors, private companies, or government agency Venture into start-up enterprises To create business advantages, especially operating in countries where these activities play an important role in helping liquidity, enabling business continuity and including marketing performance (PIP MAR) to achieve sales targets from business matching Including from the funded factors, it can be further promoted in terms of marketing activities, which is a factor that promotes and creates a positive chain effect.

2) Tax incentives for new businesses: The first three years of start-up enterprises are at the highest risk of failure. Because it is in the period when the business tends to be in a loss state. Based on the Gbadegeshin et al. (2022). At this time, if there is a policy to help with financial tax, for example, exemption of income tax of enterprises starting in the first 3 years of business establishment or tax will be collected only when dividends are paid out of the business without income tax. such as Startup Estonia) in Estonia (Liivamägi, 2017; Vabamäe & Lilles, 2017; Startup Estonia, n.d.). The financial performance factor (PIP_FIN) has a significant influence on the survival of startup enterprises. The main component of this factor is product profit and return on investment. If there is tax support for start-up enterprises, it will help enterprises to generate a greater proportion of profit from business operations. The profits obtained can be used as costs for operating the business or further expanding the business, resulting in more possibilities for the enterprise to start more survival, especially in the first 3 years of the business.

Recommendations

1) Recommendations for defining growth: According to type and business model, qualitative research should be conducted to focus on startup enterprises that can run a business with continuous growth for more than three years. which can be classified by many factors such as customer base growth employment growth Because some types of startup enterprises may not focus on income growth during the first three years, but instead focus on building a customer base. Allowing users to use the service for free at first to attract a customer base and learn customer behavior, for example. to be used to earn money later the other hand, entrepreneurs may have the goal of exiting the business through acquisitions or mergers, which many businesses have had in the past, such as Instagram and Lazada which will distinguish the model for determining a survival and success.

2) Suggestions for increasing the variety of business types: There are numerous types. Each type has different constraints and business methods. Issues can be divided separately for each type of business for researchers who want to conduct additional research. to delve deeper into each type to produce more accurate research results Furthermore, research findings can improve the opportunity to create benefits for the target group.
3) Suggestions for qualitative research: For qualitative research, the researcher can isolate the issues of each factor influencing the growth of startup enterprises according to their business model. For example, the question "Have you contacted an investor to form an alliance or sponsorship with an investor?" "You've acquired additional technical expertise while doing business" can be broken down from its constituents as to which one is more important.
As more and more start-up enterprises can start with low capital with more accessible technology and information. There is a tendency to be more and more like this, where technical knowledge It is likely to have a more significant impact on growth than seeking capital or contacting investors early in the business to early stage and testing prototypes.

References

Ács, Z., Szerb, L., & Autio, E. (2016). *Global Entrepreneurship Index 2016*. Washington, D.C.: The Global Entrepreneurship and Development Institute.

Alegre, J., Lapiedra, R., & Chiva, R. (2006). A measurement scale for product innovation performance. *European Journal of Innovation Management, 9*(4), 333-346.

Audretsch, D. (1995). Innovation, growth and survival. *International Journal of Industrial Organization, 13*(4), 441-457.

Baggio, R., & Klobas, J. (2011). *Quantitative Methods in Tourism*. Retrieved from www.perlego.com/book/571449/quantitative-methods-in-tourism-a-handbook-pdf.

Bentler, P. (2006). *EQS 6 Structural Equations Program Manual*. California: Multivariate Software, Inc.

Blindenbach-Driessen, F., van Dalen, J., & van den Ende, J. (2010). Subjective Performance Assessment of Innovation Projects. *Journal of Product Innovation Management, 27*(4), 572-592.

Burnett, D. (2000). *History of Entrepreneurship Theory*. Retrieved from http://technopreneurial.com/articles/history.asp.

Calantone, R., Cavusgil, S., & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management, 31*(6), 515-524.

Carland, J., Hoy, F., Boulton, W., & Carland, J. (1984). Differentiating Entrepreneurs from Small Business Owners: A Conceptualization. *The Academy of Management Review, 9*(2), 354-359.

CB Insights. (2018). *The Top 20 Reasons Startups Fail*. Retrieved from https://s3-us-west-2.amazonaws.com/cbi-content/research-reports/The-20-Reasons-Startups-Fail.pdf.

Chanrungmaneekul, P. (2003). *Smoothed Bootstrap Estimate for Variance of a Sample Mean*. Retrieved from www.sure.su.ac.th/xmlui/handle/123456789/8324.

Delmar, F. (1996). *Entrepreneurial Behavior and Business Performance*. Doctor of Philosophy Thesis, Stockholm School of Economics.

Efron, B. (1980). *The Jackknife, The Bootstrap, and Other Resampling Plans*. Pennsylvania: Society for Industrial and Applied Mathematics.

Gartner, W. (1988). “Who Is an Entrepreneur?” Is the Wrong Question. *American Journal of Small Business, 12*(4), 11-32.

Gartner, W., Starr, J., & Bhat, S. (1999). Predicting new venture survival: An analysis of “anatomy of a start-up.” cases from Inc. Magazine. *Journal of Business Venturing, 14*(2), 215-232.

Gbadegeshin, S., Al Natsheh, A., Ghafel, K., Mohammed, O., Koskela, A., Rimpiläinen, A., Tikkanen, J., & Kuoppala, A. (2022). Overcoming the Valley of Death: A New Model for High Technology Startups. *Sustainable Futures, 4*, 100077.

GMAP. (2007). *Small Business Survival: A Joint Report to the Governor*. Retrieved from https://tailieumienphi.vn/doc/small-business-survival-a-joint-report-to-the-governor-kew3tq.html.

Graham, P. (2012). *Startup = Growth*. Retrieved from www.paulgraham.com/growth.html.

Griffin, A., & Page, A. (1996). PDMA Success Measurement Project: Recommended Measures for Product Development Success and Failure. *Journal of Product Innovation Management, 13*(6), 478-496.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate Data Analysis*. 7th ed. New York: Pearson.

Hannachi, Y. (2015). Development and Validation of a Measure for Product Innovation Performance: The PIP Scale. *Journal of Business Studies Quarterly, 6*(3), 23-35.

Hofer, C., & Bygrave, W. (1992). Researching Entrepreneurship. *Entrepreneurship Theory and Practice, 16*(3), 91-100.

Hsu, Y., & Fang, W. (2009). Intellectual capital and new product development performance: The mediating role of organizational learning capability. *Technological Forecasting and Social Change, 76*(5), 664-677.

Janáková, H. (2015). The Success Prediction of the Technological Start-up Projects in Slovak Conditions. *Procedia Economics and Finance, 34*, 73-80.

Kao, J. (1989). *Entrepreneurship, Creativity & Organization: Text, Cases & Readings*. New Jersey: Prentice Hall.

Kazanjian, R., & Drazin, R. (1990). A stage-contingent model of design and growth for technology based new ventures. *Journal of Business Venturing, 5*(3), 137-150.

Kline, R. (2016). *Principles and Practice of Structural Equation Modeling*. 4th ed. New York: The Guilford Press.

Liivamägi, E. (2017). *How do e-residents pay taxes?*. Retrieved from https://e-estonia.com/how-do-e-residents-pay-taxes/.

McClelland, D. (1965). N achievement and entrepreneurship: A longitudinal study. *Journal of Personality and Social Psychology, 1*(4), 389-392.

Misumi, J., & Peterson, M. (1985). The performance-maintenance (PM) theory of leadership: Review of a Japanese research program. *Administrative Science Quarterly, 30*(2), 198-223.

National Innovation Agency. (2021). *Startup Thailand Ecosystem*. Retrieved from https://ecosystem.startupthailand.org/.

Nicholls-Nixon, C. (2005). Rapid Growth and High Performance: The Entrepreneur's "Impossible Dream?". *The Academy of Management Executive, 19*(1), 77-89.

Organisation for Economic Co-operation and Development. (2007). *Eurostat-OECD Manual on Business Demography Statistics*. Luxembourg: Official publications of the European Communities.

Ortiz-Villajos, J., & Sotoca, S. (2018). Innovation and business survival: A long-term approach. *Research Policy, 47*(8), 1418-1436.

Palmer, M. (1971). The Application of Psychological Testing to Entrepreneurial Potential. *California Management Review, 13*(3), 32-38.

Reid, G. (1993). *The Survival of Small Business Enterprise*. St Andrews: University of St Andrews.

Ries, E. (n.d.). *The Lean Startup | Methodology*. Retrieved from https://theleanstartup.com/principles.

Rovinelli, R., & Hambleton, R. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Tijdschrift voor Onderwijsresearch, 2*(2), 49-60.

Shane, S., & Venkataraman, S. (2001). Entrepreneurship As a Field of Research: A Response to Zahra and Dess, Singh, and Erikson. *Academy of Management Review, 26*, 13-16.

Smith, V. (2007). *Acknowledgements Study Coordinators Small Business Survival: A Joint Report by the Departments of Community, Trade and Economic Development, Employment Security, Labor and Industries, and Revenue*. Retrieved from www.acc ountability.wa.gov.

Startup Estonia. (n.d.). *About — Startup Estonia*. Retrieved from https://startupestonia.ee/ about.

Steve Blank. (2010). *Steve Blank What's a Startup? First Principles*. Retrieved from https://steveblank.com/2010/01/25/whats-a-startup-first-principles/.

Storey, C., & Easingwood, C. (1999). Types of New Product Performance: Evidence from the Consumer Financial Services Sector. *Journal of Business Research, 46*(2), 193-203.

Suomala, P. (2004). Multifaceted new product development performance: Survey of utilization of performance measures in Finnish industry. *European Journal of Innovation Management, 9*(4), 333-346.

Thai Venture Capital Association. (2016). *Thai Startup Founders Survey 2016*. Retrieved from www.slideshare.net/tvcaorth/thai-startup-founders-survey-2016-65224397.

Thompson, P. (2005). Selection and Firm Survival: Evidence from the Shipbuilding Industry, 1825-1914. *The Review of Economics and Statistics, 87*(1), 26-36.

Tohidi, H., & Jabbari, M. (2012). Product Innovation Performance in Organization. *Procedia Technology, 1*, 521-523.

Vabamäe, K., & Lilles, K. (2017). *Why is Estonia a Startup Paradise?*. Retrieved from https://e-estonia.com/why-is-estonia-a-startup-paradise/.

Van Voorhis, C., & Morgan, B. (2007). Understanding Power and Rules of Thumb for Determining Sample Sizes. *Tutorials in Quantitative Methods for Psychology, 3*(2), 43-50.

Vesper, K. (1990). *New Venture Strategies*. New Jersey: Prentice Hall.

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