

KEY SUCCESS FACTORS DRIVE LIFE SCIENCES STARTUPS IN THAILAND

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Abstract

Life Sciences or health-care and medical startup is a global trend toward new innovative industries. In Thailand, there are numbers of life sciences startups are born each year. However, the life sciences business characteristic and business model that differ from other businesses urge the needs to understand the factors of success relevant or influence the stages of development. This understanding may be used to mitigate the risks of failure and, consequently, increase their success. Therefore, this study explored the critical success factors that influencing success, and factors that are most important at different stages of development. This study has followed a series of steps to provide a systemic, transparent and reproducible methodology through quantitative methods. The researcher developed a survey questionnaire to find the relationship of important variables and used the data from the 240 samples analysed basic statistic and confirmatory second order factor analysis based on the principle of latent variables in Structural Equation Modeling (SEM). It was found that the success of life sciences startups in each development stage comes from various factors with different influences. During the seed or incubation stage, the most important factor is human capital, followed by startup support and culture. Meanwhile in the early stage, the most important factor is startup support, followed by human capital and culture. During the growth stage, the finance factor contributes to success the most, followed by the market factor and human capital factor, while during the expansion stage, human capital is the most important, followed by culture and market factor.

Keywords: Startup, Entrepreneur, Entrepreneurship, Business Economics, Factor Analysis.

INTRODUCTION

As life sciences technology has become more and more important, the Thai government has formulated the 20-year industrial development strategic plan 4.0 (2017-2036) and defined the guidelines for the development of new target industries that will serve as an important mechanism to drive the country's economy in the future (New S-Curve). The life sciences industry is related to 3 new target industries,

namely robotics, digital, and medical hub, and the situation of the COVID-19 pandemic has made life sciences startup entrepreneurs in Thailand become even more important.

Currently, there are researchers and Thai companies with potential and capability to develop medical and health innovations. Some of them have been established as startups and can reach the seed round stage. According to a survey of startups in Thailand by the Office of

National Higher Education, Science, Research and Innovation Policy Council (NXPO) together with the Thailand Tech Startup Association (TTSA), it was found that the number of startups in the medical and health industry ranked fifth. However, the establishment and growth of medical and health startups is different from other business groups because it relies on consumer confidence. It also needs more time when compared to other businesses to test products before they are brought to the market. Therefore, a different business model may be required as opposed to other businesses, and success factors need to be determined for business planning. The results of this study will help related parties to create a mechanism to appropriately support startup entrepreneurs and will serve as a guideline for new startup entrepreneurs to run their business, ensuring sustainable growth.

THEORETICAL BACKGROUND

Startup key success factors

The success of each startup may be valued or defined differently, such as market share or number of customers (Gelderen et al., 2005), profits or sales that increases or exceeds the market average, meeting the founder's target, such as owning a business or promoting better quality of life for society (Wong et al., 2005).

A number of studies are currently underway to look at the factors affecting the success of startups, which are quite extensive and varied. This research is based on the elements of factors contributing the success of entrepreneurs according to the concept of Isenberg (2011), who examined the success of entrepreneurs that applied innovations in conjunction with the use of past research through more than 22 years of entrepreneur development experience. It was found that the success of entrepreneurs depends on 6 key elements:

Government policy factor: The research (Arruda et al., 2013; Pugliese et al., 2016; Geibel and Manickam, 2016) found that financial support from the public sector in the

form of funds or gifts, especially in the early stage of startup development has a huge impact on the success of the startup. On the other hand, Okrah et al. (2018) found that tax incentives play an important role in the success of startups. The study by the National Startup Committee (2016) found that laws that facilitate startup business contribute to success of startups.

Startup support factor: The research (Cheah et al., 2016; Thanapongporn et al., 2021) found that having a place and infrastructure allowing startups to run their business from the early stage is a key factor for the success of startup entrepreneurs. Meanwhile, the research by Teeter and Whelan-Berry (2008) found that seeking professional services would contribute to the success of startups. In addition, the research by Krajcik and Formanek (2015) found that the actions of incubators/accelerators contribute to the success of startups. The research (Lee, 2010; Mueller et al., 2012; Geibel and Manickam, 2016) found that startup activities such as seminars to exchange experience, business matching, business collaboration, and business network, etc., play an important role in the success of startups.

Human capital factor: The study by Cheah et al. (2016) found that entrepreneurial capability has a positive effect on the level of success of startups. This is because competence, skills and knowledge are factors that help startups gain business advantage (Lee, 2010). Meanwhile, according to the research by Khong-khai and Wu (2018), the innovation capability of entrepreneurs and founders in applying innovations to corporate products is a key contributor to the startup success. Additionally, the research by Geibel and Manickam (2016) found that the startup team plays an important role in successful startups. Many studies found that the founder's experience in research, organizational management, and business operations all contributes to startup success (Gelderen et al., 2005; Beckman and Burton, 2008; Arruda et al., 2013; Hyder and Lussier, 2016; Thanapongporn et al., 2021).

Market factor: The research (Nalintippayawong et al., 2018; Prohorovs et al., 2019) found that outstanding products or services that can solve customer pain point problems and create satisfaction play a key role in making startups successful. Startups having products or services with a high level of innovation are more likely to be successful than those having products with a lower level of innovation. Meanwhile, a variety of studies have shown that the price management factor could contribute to consumer interest and success for startups (Nalintippayawong et al., 2018). The research of Prohorovs et al. (2019) found that the ability to scale up production capacity both for domestic and international customers while still maintaining product standards would result in the success of startup entrepreneurs. In addition, having a clear and executable exit strategy would have a positive effect on success of startups (National Startup Committee, 2016). The fact that entrepreneurs have a network to expand their business or have a business partner is also an important factor. Mueller et al. (2012) found that participation in startup clusters or business grouping is positively correlated with the success of startups. The same is true for the study of Sefiani and Bown (2013), which found that the increased number of business partners leads to the increased level of startup success.

Finance factor: The research by Bocken (2015) found that sufficient private funds for entrepreneurs, especially in the early stage, has a direct impact on the success of startup entrepreneurs while many studies found that angel funds are important to the success of startup entrepreneurs (Boden Jr and Nucci, 2001; Bocken, 2015). A number of studies found that venture capital funding is crucial to the success of startup entrepreneurs (Reynolds and Miller, 1992; Castrogiovanni, 1996; Prohorovs et al., 2018), and another group of research found that financial institution loans contributes to the success of startup entrepreneurs as it is a source of funding where funds will be granted upon entrepreneurs' consideration on business feasibility (Boden Jr and Nucci, 2001; Bocken, 2015; Okrah et al., 2018). The research by Okrah et al. (2018)

found that capital market funding is another important channel for startup success, especially in the growth phase that requires quite a lot of capital to expand the business.

Culture factor: The research by Prohorovs et al. (2018) found that business motivation and founder awareness of success stories play an important role in the success of startup entrepreneurs. Meanwhile, the research by Timmons and Spinelli (2004) found that awareness of social status of startups through various media is an important factor for the success of startup entrepreneurs.

Stages of startup development

The stage of development of a startup can be divided into several dimensions. For example, Wong et al. (2005) divides startup development into 6 stages: preparation for start-up, incubation process, incubatee performance measures, exit policies, parental care, and disconnect incubator. Meanwhile, Lee (2010) divides the development into 3 stages, namely incubation, growing, and maturing, in line with Ng et al. (2014), who divides startup development into three stages -- early, growth and development, and expansion. Bocken (2015) divides startup development into four stages, covering stages of development mentioned in other studies. The four development stages of a startup include seed stage, which is an idea phase when the founding team is formed, the products or services have already been designed or prototyped, but not yet released to the market; early or young stage, which is the period of production of goods or services, and when goods or services begin to enter the market; growth stage, which is the period when the startup has the age of about 2-3 years, its sales and number of customers increase, and the startup begins to compete with competitors; expansion/growing stage, which is the period when sales start to stabilize, the products are known in the market, and the startup is ready to increase its production capacity or expand its business. This research aims to study the stage of startup development as defined by Bocken (2015).

Relationship between success factors and stages of startup development

According to literature review, it shows that each stage of startup development may have different success factors. For example, for the incubation stage, success factors are good plans and funding from founders or investors (Wong et al., 2005) because during this stage, startups do not have any income. For the early stage in which the products or services have already entered the market, the success factor is the development of products and services (Ng et al., 2014). For the growth stage, if a startup is able to pass the early stage of the business, it means that the business plan during the incubation stage is good. The driving factor for success therefore is an increase in market shares and capital investment (Mueller et al., 2012). During the expansion or growing stage, entrepreneurs may need to use business

partners to expand their business. There must also be other driving factors for success, namely the enhancement of team management skills and the availability of new products and services Ng et al. (2014).

As the measure of success and the factors driving the success of startups can vary from one stage of development to another, accurate identification of success factors in each stage should be applied in business planning, strategic planning and business management to increase the potential in each stage and enhance competitiveness. By reviewing Isenberg's concept (2011) and the relevant literature, variables in the study could be determined. It was found that the success of startup entrepreneurs consists of 6 latent variables and 23 observed variables. The composition can be summarized as shown in Fig. 1 and Table-1.

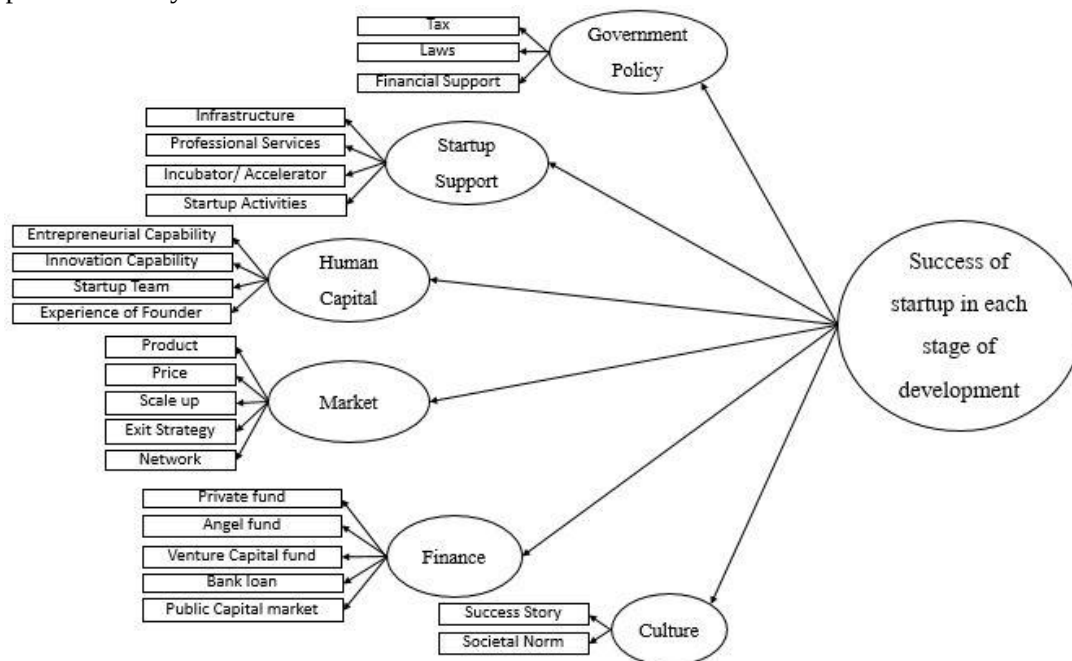


Fig. 1: Conceptual framework and variable components in research

Table-1: Summary of literature review in each factor

Latent variables	Observed variables	References
Government policy (GP)	Taxes (P1)	Cheah et al., 2016; Okrah et al., 2018
	Laws (P2)	National Startup Committee, 2016; Okrah et al., 2018
	Financial support from government (P3)	Vu et al., 2012; Arruda et al., 2013; Pugliese et al., 2016; Geibel and Manickam, 2016

Startup support (SS)	Infrastructure (S1)	Cheah <i>et al.</i> , 2016; Worapongdī, 2017; Thanapongporn <i>et al.</i> , 2021
	Professional services (S2)	Teeter and Whelan-Berry, 2008; Cheah <i>et al.</i> , 2016
	Incubator/Accelerator (S3)	Peña, 2004; Radojevich-Kelley and Hoffman, 2012; Krajcik and Formanek, 2015; Worapongdī, 2017
	Startup activities (S4)	Lee, 2010; Mueller <i>et al.</i> , 2012; Geibel and Manickam, 2016
Human capital (HC)	Entrepreneurial Capability (H1)	Vliamos and Tzeremes, 2012; Cheah <i>et al.</i> , 2016; Geibel and Manickam, 2016; Khong-khai and Wu, 2018; Prohorovs <i>et al.</i> , 2018
	Innovation Capability (H2)	Baum and Silverman, 2004; Worapongdī, 2017; Khong-khai and Wu, 2018
	Startup team (H3)	Geibel and Manickam, 2016; Khong-khai and Wu, 2018
	Experiences of the founding team (H4)	Vu <i>et al.</i> , 2012; Yoo <i>et al.</i> , 2012; Arruda <i>et al.</i> , 2013; Cannone and Ughetto, 2014; Thiranagama and Edirisinghe, 2015; Hyder and Lussier, 2016; Thanapongporn <i>et al.</i> , 2021
Market (MK)	Product (M1)	Nalintippayawong <i>et al.</i> , 2018; Prohorovs <i>et al.</i> , 2018
	Price (M2)	Tsai <i>et al.</i> , 1991; Nalintippayawong <i>et al.</i> , 2018
	Scale up (M3)	Geibel and Manickam, 2016; Prohorovs <i>et al.</i> , 2018
	Exit strategy (M4)	Tsai <i>et al.</i> , 1991; National Startup Committee, 2016
	Networks (M5)	Sefiani and Bown, 2013; Nalintippayawong <i>et al.</i> , 2018; Prohorovs <i>et al.</i> , 2018
Finance (FN)	Private fund (F1)	Boden Jr and Nucci, 2001; Bocken, 2015; Thanapongporn <i>et al.</i> , 2021
	Angel fund (family, Friend) (F2)	Boden Jr and Nucci, 2001; Bocken, 2015
	Venture Capital fund (F3)	Bocken, 2015; Lee, 2010; Okrah <i>et al.</i> , 2018; Thanapongporn <i>et al.</i> , 2021
	Loan (bank) (F4)	Boden Jr and Nucci, 2001; Bocken, 2015; Okrah <i>et al.</i> , 2018
	Capital market (F5)	Bocken, 2015; Okrah <i>et al.</i> , 2018
Culture (CT)	Success Stories (C1)	Reynolds and Miller, 1992; Castrogiovanni, 1996; Prohorovs <i>et al.</i> , 2018
	Social Status of Startup (C2)	Timmons and Spinelli, 2004; Okrah <i>et al.</i> , 2018; Thanapongporn <i>et al.</i> , 2021

Hypothesis

The researcher set 6 hypotheses for each stage of development as follow:

H1 : The government policy factor influences success of life sciences startups in Thailand.

H2 : The startup support factor influences success of life sciences startups in Thailand.

H3 : The human capital factor influences success of life sciences startups in Thailand.

H4 : The market factor influences success of life sciences startups in Thailand.

H5 : The finance factor influences success of life sciences startups in Thailand.

H6 : The culture factor influences success of life sciences startups in Thailand.

MATERIALS AND METHOD

The population in this research is life sciences (medical and health) entrepreneurs registered as a juristic person with the objective to serve as a manufacturer and a wholesaler of products in the medical and health industry in three groups: pharmaceuticals (drugs), medical devices, and cosmetics and dietary supplement products, with a period of incorporation of a juristic person not exceeding 5 years and with the business still under operations (2019-2020). From retrieval of information from the Department of Business Development, the Ministry of Commerce, it was found that at the end of 2020, there were 4,562 entrepreneurs who met the criteria. The minimum sample size was determined by analyzing Structural Equation Modeling. Due to the large sample size, there is a greater likelihood that the variable will be normalized than the smaller sample. Meanwhile, Blunch (2012) suggested that the sample used in Structural Equation Modeling should not be too small and proposed the sample size of not less than 10 times per observed variable. Furthermore, the research by Hair et al. (2013) suggested that the mean sample size of Structural Equation Modeling should be 10 times the observed variables. Therefore, in this study, the researcher used the sample size of 10 times the observed variables. The number of observed variables from the relevant literature review was 23, which was then multiplied by 10, so the sample size in this study is 230. The sampling method was based on the principle of probability sampling called stratified random sampling. In other words, the sample group for data collection was determined according to the objectives of company incorporation in three main product groups, namely pharmaceuticals (drugs), medical devices and services, and cosmetics and dietary supplement products according to the proportion of the population. The data were collected between December 2021 - February 2022 by online survey.

For the quantitative research method, the researcher developed a survey questionnaire to find the relationship of important variables based on variables, questionnaire items and synthesis from the review of relevant literature. The researcher used the 7-point Likert Scale with statements showing the level of the interval scale measurement, and used the data from the sample as a unit for analysis. Basic statistical analysis and confirmatory factor analysis were employed to analyze the questionnaire data based on the principle of latent variables in Structural Equation Modeling (SEM) using AMOS program.

The researcher used a second order confirm factor analysis because the variables studied were complex theoretical variables. With the second order confirmation element analysis, the relationship of the elements could be explained more than using the first order confirmation element analysis. The researcher performed the analysis using AMOS Program version 21 and presented the goodness of fit analysis results and correlation of each variable component through statistical values to determine the conditions of the model fit as follows: regression weight (factor loading) representing the significance weight that each latent variable is influenced or extracted from the preceding variable, Chi-square/degree of freedom (CMIN/df) representing the overall goodness of fit of the correlation model which should be less than 3 (Bentler and Bonett, 1980), The goodness-of-fit index (GFI) and adjusted GFI (AGFI) must be greater than 0.8 (Seyal et al., 2002), the normalized fit index (NFI) and the incremental fit index of improved NFI (CFI) must be greater than 0.9 (Bentler and Bonett, 1980), and the root-mean-square error of approximation (RMSEA) must be less than 0.08 (Hair et al., 2013).

RESULT AND DISCUSSION

The researcher was able to collect 240 completed questionnaires, which was more than the target number. It was found that 65% of the respondents were startup of cosmetics and dietary supplement products, followed by

pharmaceuticals (22.5%), and medical devices and services (12.5%), respectively. When the period of business operation was considered, it was found that 50% had been in the business for 3 years, followed by 4 years (30%), and 5 years (20%), respectively. All of them are in the expansion stage.

The results showed that the 6 components influence the success of entrepreneurs in the four stages of startup development as show the detail by t-test in Table-2 and Fig. 2 - 5. When the standard regression coefficients were considered, the factors critical to the success of startup entrepreneurs in life sciences in each success stage can be summarized in Table-3. In Table-3, it can be seen that the human capital

factor has the greatest influence on success during the incubation stage and the expansion stage, which is consistent with research in the Netherlands (Gelderen et al., 2005), Taiwan (Lin et al., 2006), the U.S. (Beckman and Burton, 2008), Vietnam (Vu et al., 2012), South Korea (Yoo et al., 2012) and Brazil (Arruda et al., 2013) However, at the early stage, it was found that the startup support factor was the most influential, which is consistent with the research in the U.S. (Teeter and Whelan-Berry, 2008) and Singapore (Cheah et al., 2016) while the finance factor was the most influential factor in the growth stage, which is consistent with the research in Europe and the U.S. (Bocken, 2015), Latvia and Russia (Prohorovs et al., 2018).

Table-2 : *Result hypothesis test*

Stage of development	Hypothesis	Coefficient	Standard coefficient	C.R. value
Seed stage	H1	0.347***	0.341	4.821
	H2	0.707***	0.989	13.1
	H3	0.82***	1.092	13.03
	H4	0.643***	0.841	14.29
	H5	0.583***	0.558	8.52
	H6	1***	0.878	12.53
Early or young stage	H1	0.135**	0.413	2.856
	H2	1.436***	1.064	10.88
	H3	1.32***	0.945	11.85
	H4	0.916***	0.812	10.41
	H5	0.063	0.579	1.798
	H6	1***	0.939	10.31
Growth stage	H1	0.983***	0.762	7.97
	H2	0.793***	0.816	10.04
	H3	1.581***	0.953	14.76
	H4	1.042***	1.025	13.06
	H5	0.735***	1.127	9.02
	H6	1***	0.941	10.42
Expansion or growing	H1	1.884***	0.749	10.97

stage	H2	0.438***	0.611	5.92
	H3	2.185***	1.02	14.74
	H4	0.746***	0.753	9.92
	H5	0.459***	0.465	5.92
	H6	1***	0.9	10.31

Note *** $r < 0.001$, ** $r < 0.01$ and * $r < 0.05$

Table-3: Ranking of the key factors influencing the success of life sciences startups in each development stage

Stage of development	Ranking					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Seed stage	Human Capital (HC)	Startup Support (SS)	Culture (CT)	Market (MK)	Financial (FN)	Government Policy (GP)
Early or young stage	Startup Support (SS)	Human Capital (HC)	Culture (CT)	Market (MK)	Financial (FN)	Government Policy (GP)
Growth stage	Financial (FN)	Market (MK)	Human Capital (HC)	Culture (CT)	Startup Support (SS)	Government Policy (GP)
Expansion or growing stage	Human Capital (HC)	Culture (CT)	Market (MK)	Government Policy (GP)	Startup Support (SS)	Financial (FN)

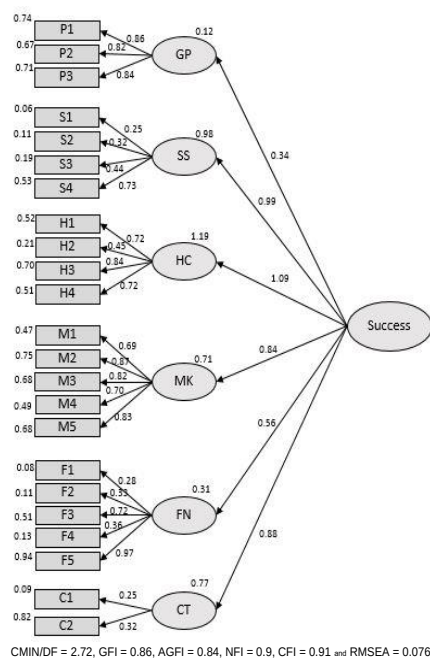


Fig. 2 : Second order factor analysis of success of life sciences startup in seed stage

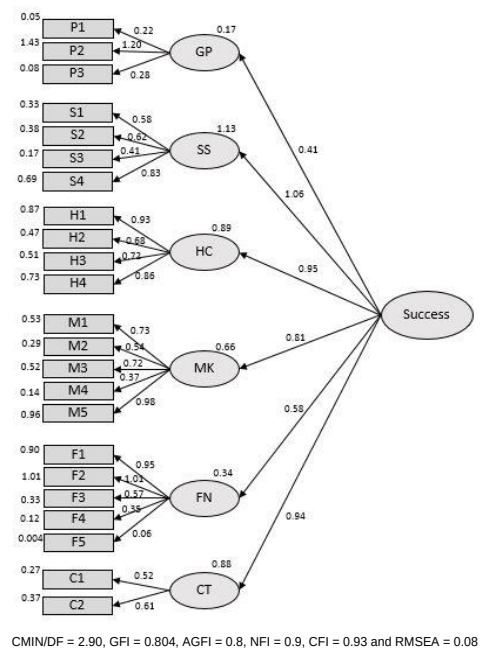


Fig. 3 : Second order factor analysis of success of life sciences startup in early or young stage

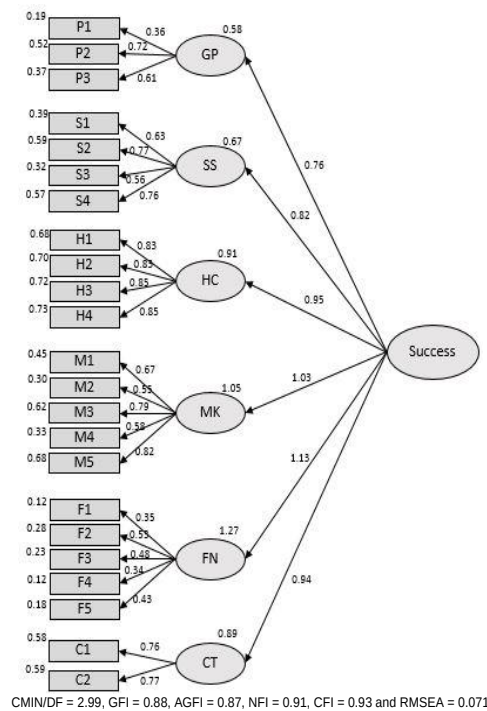


Fig. 4 : Second order factor analysis of success of life sciences startup in growth stage

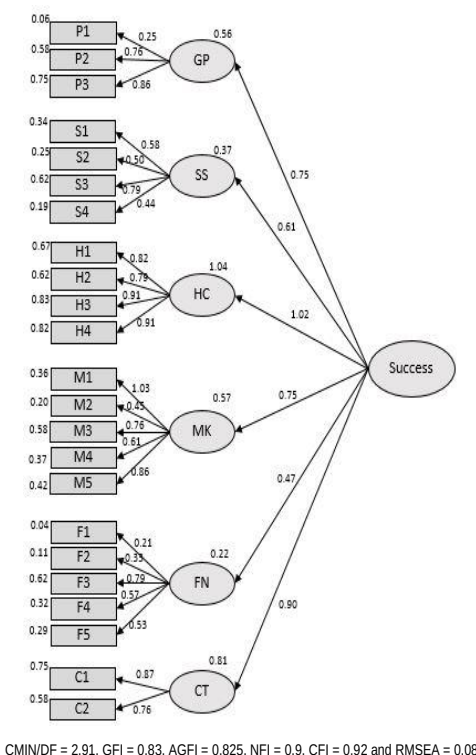


Fig. 5 : Second order factor analysis of success of life sciences startup in expansion or growing stage

CONCLUSION

From the research findings, it was found that medical and health startup entrepreneurs in Thailand can be successful because of the 6 elements, which are government policy, startup support, human capital, market, finance, and culture.

However, when the results of studies in each startup development stage were considered, it was found that the success of startup entrepreneurs in each stage comes from various factors with different influences. During the incubation stage, the most important factor is human capital, followed by startup support and culture. Meanwhile in the early stage, the most important factor is startup support, followed by human capital and culture. During the growth stage, the finance factor contributes to success the most, followed by the market factor and human capital factor, while during the expansion stage, human capital is the most important, followed by culture and market.

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Reference

- [1] Arruda, C., Nogueira, V. S. and Costa, V. (2013). The Brazilian entrepreneurial ecosystem of startups: An analysis of entrepreneurship determinants in Brazil as seen from the OECD pillars. *Journal of Entrepreneurship and Innovation Management*, 2(3): 17–57.
- [2] Baum, J. A. and Silverman, B. S. (2004). Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. *Journal of business venturing*, 19(3): 411–436.
- [3] Beckman, C. M. and Burton, M. D. (2008). Founding the future: Path dependence in the evolution of top management teams from founding to IPO. *Organization science*, 19(1): 3–24.

- [4] Bentler, P. M. and Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological bulletin*, 88(3): 588–606.
- [5] Blunch, N. (2012). Introduction to structural equation modeling using IBM SPSS statistics and AMOS. Sage.
- [6] Bocken, N. M. (2015). Sustainable venture capital–catalyst for sustainable start-up success? *Journal of cleaner production*, 108: 647–658.
- [7] Boden, R. J. and Nucci, A. R. (2000). On the survival prospects of men's and women's new business ventures. *Journal of Business Venturing*, 15: 347–362.
- [8] Cannone, G. and Ughetto, E. (2014). Born globals: A cross-country survey on high-tech start-ups. *International Business Review*, 23(1): 272–283.
- [9] Castrogiovanni, G. J. (1996). Pre-startup planning and the survival of new small businesses: Theoretical linkages. *Journal of management*, 22(6): 801–822.
- [10] Cheah, S., Ho, Y. P. and Lim, P. (2016). Role of public science in fostering the innovation and startup ecosystem in Singapore. *Asian Research Policy*, 7(1): 78–93.
- [11] Geibel, R. C. and Manickam, M. (2016). Comparison of selected startup ecosystems in Germany and in the USA Explorative analysis of the startup environments. *GSTF Journal on Business Review (GBR)*, 4(3).
- [12] Gelderen, M. V., Thurik, R. and Bosma, N. (2005). Success and risk factors in the pre-startup phase. *Small Business Economics*, 24(4): 365–380.
- [13] Hair, J. F., Hult, G. T. M., Ringle, C. M. and Sarstedt, M. (2013). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks: Sage.
- [14] Hyder, S. and Lussier, R. N. (2016). Why businesses succeed or fail: a study on small businesses in Pakistan. *Journal of Entrepreneurship in Emerging Economies*, 8(1): 82–100.
- [15] Isenberg, D. (2011). The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship. Presentation at the Institute of International and European Affairs, 1(781): 1–13.
- [16] Khong-khai, S. and Wu, H. Y. (2018). Analysis of Critical Success Factors of Startups in Thailand. *Indian Journal of Public Health Research & Development*, 9(11): 1262–1268.
- [17] Krajcik, V. and Formanek, I. (2015). Regional startup ecosystem. *European Business & Management*, 1(2): 14–18.
- [18] Lee, Y. J. (2010). Technology strategy by growth stage of technology-based venture companies. *International Review of Business Research Papers*, 6(6): 216–234.
- [19] Lin, B. W., Li, P. C. and Chen, J. S. (2006). Social capital, capabilities, and entrepreneurial strategies: a study of Taiwanese high-tech new ventures. *Technological Forecasting and Social Change*, 73(2): 168–181.
- [20] Mueller, S., Volery, T. and Von Siemens, B. (2012). What do entrepreneurs actually do? An observational study of entrepreneurs' everyday behavior in the start-up and growth stages. *Entrepreneurship Theory and Practice*, 36(5): 995–1017.
- [21] Nalintipayawong, S., Waiyawatpattarakul, N. and Chotipant, S. (2018). Examining the critical success factors of startup in Thailand using structural equation model. 2018 10th International Conference on Information Technology and Electrical Engineering (ICITEE). Retrieved from [https:// 10.1109/ICITEED.2018.8534854](https://10.1109/ICITEED.2018.8534854)
- [22] National Startup Committee. (2016). White Paper of Startup to build startup ecosystem in Thailand. Retrieved from <https://www.marketingoops.com/news/tech-update/white-paper-for-startup-ecosystem>.
- [23] Ng, A. W., Macbeth, D. and Southern, G. (2014). Entrepreneurial performance of early-stage ventures: dynamic resource management for development and growth. *International Entrepreneurship and Management Journal*, 10(3): 503–521.
- [24] Okrah, J., Nepp, A. and Agbozo, E. (2018). Exploring the factors of startup success and growth. *The Business & Management Review*, 9(3): 229–237.
- [25] Peña, I. (2004). Business incubation centers and new firm growth in the Basque country. *Small Business Economics*, 22(3): 223–236.

- [26] Prohorovs, A., Bistrova, J. and Ten, D. (2019). Startup Success Factors in the Capital Attraction Stage: Founders' Perspective. *Journal of east-west business*, 25(1): 26–51.
- [27] Pugliese, R., Bortoluzzi, G. and Zupic, I. (2016). Putting process on track: empirical research on start-ups' growth drivers. *Management Decision*, 54(7): 1633–1648.
- [28] Radojevich-Kelley, N. and Hoffman, D. L. (2012). Analysis of accelerator companies: An exploratory case study of their programs, processes, and early results. *Small Business Institute Journal*, 8(2): 54–70.
- [29] Reynolds, P. and Miller, B. (1992). New firm gestation: Conception, birth, and implications for research. *Journal of business venturing*, 7(5): 405–417.
- [30] Seyal, A.H., Rahman, M.N.A. and Rahim, M.M. (2002). Determinants of academic use of the Internet: a structural equation model. *Behaviour & Information Technology*, 21(1): 71–86.
- [31] Teeter, R. A. and Whelan-Berry, K. S. (2008). My firm versus our firm: The challenge of change in growing the small professional service firm. *The Journal of Business Inquiry*, 7(1): 41–52.
- [32] Thanapongporn, A., Ratananopdonsakul, R. and Chanpord, W. (2021). Key success factors and framework of fundraising for early-stage startups in Thailand. *Academy of Strategic Management Journal*, 20: 1–16.
- [33] Thiranagama, R. and Edirisinghe, K. (2015). Factors affecting small business start-up of engineers and accountants in Sri Lanka. *NSBM Business & Management Journal*, 6(1): 84–107.
- [34] Tsai, W. M. H., MacMillan, I. C., & Low, M. B. (1991). Effects of strategy and environment on corporate venture success in industrial markets. *Journal of business venturing*, 6(1): 9–28.
- [35] Van Gelderen, M., Thurik, R. and Bosma, N. (2006). Success and risk factors in the pre-startup phase. *Small Business Economics*, 26(4): 319–335.
- [36] Vliamos, S. J., & Tzeremes, N. G. (2012). Factors influencing entrepreneurial process and firm start-ups: evidence from central Greece. *Journal of the Knowledge Economy*, 3(3): 250–264.
- [37] Vu, D. A., Bui, Q. H. and Pham, T. Q. (2012). Critical success factors for Vietnamese software companies: A framework for investigation. *development*, 3(2): 160–169.
- [38] Wong, W.-K., Cheung, H.-M. and Venuvinod, P. K. (2005). Assessing the growth potential of high-technology Start-Ups: An exploratory study from Hong Kong. *Journal of Small Business & Entrepreneurship*, 18(4): 453–470.
- [39] Yoo, C., Yang, D., Kim, H. and Ho, E. (2012). Key value drivers of startup companies in the new media industry—The case of online games in Korea. *Journal of Media Economics*, 25(4): 244–260.