

KEY SUCCESS FACTORS OF STARTUP IN BUSINESS INCUBATION AT BUSINESS INCUBATOR IPB UNIVERSITY

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ABSTRACT

Background: Nowadays startups are no longer a thing. Startups are mushrooming and attracting much attention both nationally and internationally. Business incubation activities are essential for startups, because many startups that have yet to have time to develop but have to stop running their operations.

Purpose: This study aims to analyze the success of startups in business incubation and the key success factors of startups in business incubation at the IPB University Business Incubator.

Design/methodology/approach: They use the quantitative comparison method and interpretive structural modelling (ISM).

Findings/Result: The results showed that the incubation program can increase sales, production capacity, and the number of employees. In the ISM analysis results, dependent factors include startup selection, commercialization process, product excellence, and implementation capacity. Connecting factors include innovative capacity, monitoring, team management, startup resources, internal startup culture, innovation ecosystem, communication, and information technology. Business incubator technical support and startup founder leadership are independent factors. Network capacity and business intelligence are the most influential.

Conclusion: Thus, the IPB University Business Incubator effectively improves startup performance, and the key success factors in accelerating startup growth are network capacity and business intelligence.

Originality/value (State of the art): This is the first time anyone has used the ISM method to illustrate the relationship between these factors and analyze the impact of business incubation on participants.

Keywords: business incubators, business ecosystem, ISM, key success factors, startups growth

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INTRODUCTION

Startups are becoming increasingly common and gaining attention on both national and international levels. In Southeast Asia, Indonesia boasts the highest number of startups, with 2,345 scattered across the country and ranks fifth in the world for the most startups, according to the 2022 Startup Ranking. To encourage the growth of startups in Indonesia, the government has launched the National Movement of 1000 Digital Startups, which provides extensive coaching to create 1000 startups with a combined business valuation of USD 10 billion by 2020, focusing on digital technology. Establishing a startup is not enough for success. Many startups need help to develop and sustain their operations fully. Statistically, startups fail more often than they succeed. For example, the Bureau of Labor Statistics reports that up to 90% of startups in the US fail within ten years. In Indonesia, 1,300 startups joined the National Movement of 1000 Digital Startups program in 2022, but only 10% survived thus far, according to Ministry of Communication and Information Technology data. Furthermore, the Creative Industry Society notes that the growth of startups in Indonesia from 2016–2019 needs to be improved.

Based on this, the existence of business incubators is essential. Startups in incubators are more likely to survive, with 80% to 90% still in business after five years or after leaving the business incubator (Zhang and Zhou, 2021; Van Rijnsoever, 2022). Business incubators can increase startups' survival and growth rate (Vanderstraeten et al. 2016). Business incubators help develop strong business and social networks to provide added value to startups in the form of intellectual and material resources (Pettersen et al. 2015). Some startup performances boosted by business incubators in higher education include increased turnover, workforce, business legality, and access to capital sources within one year (Habiburrahman et al. 2022).

However, to what extent do startups participating in business incubation achieve better performance than before? Then, if business incubation treatment can improve startup performance, what are the key success factors of business incubators in accelerating startup growth? According to (Stubberud, n.d.), in line with (Hackett & Dilts, 2004), there is still a need for more current research that specifically addresses how incubated startups develop within business incubators.

According, (Leitão et al. 2022) future research is expected to focus on the influence of business incubators on startup growth. Also, according to (Sohail et al. 2023) there still needs to be more evidence in systematic literature reviews examining the impact of the incubation process on various performance indicators of incubators and incubation participants.

Based on data from the Association of Indonesian Business Incubators (AIBI) in 2022, the number of business incubators in Indonesia is 142, including the IPB University Business Incubator. IPB University Incubator has two focus areas for startup development: food, health, information technology, creative industry, and agriculture. Of a total of 55 startups that passed the selection in the 2018-2020 entry year figures, a percentage of 80% of startups were declared to have passed business incubation, and the remaining 20% of startups were declared not to have passed business incubation at the IPB University Business Incubator.

Startup needs include increasing turnover, production capacity, number of employees, market, or licensing. Production capacity, number of employees, market, or licensing. Therefore, startups should look for a business incubator specializing according to the needs assessment. Some startup performances boosted by business incubators in higher education include increased turnover, workforce, legal, and access to capital sources within one year (Habiburrahman et al. 2022). However, to what extent can startups participating in business incubation perform better than before? Better performance than before? Then, if business incubation treatment can improve startup performance, what are the key success factors for startups in business incubation? Startups in business incubation?

This research contributes to the underlying discussion by conducting a quantitative approach using the Wilcoxon Test comparative analysis and analytical Interpretative Structural Modeling (ISM) on the data of startups participating in business incubation and discussions with experts from the startup community and business incubators. Startup performance is measured by sales value, production capacity, and number of employees. Then, from the results of the literature study, 16 factors were obtained that positively affect the success of startups in business incubation, namely: 1) Network capacity; 2) startup resources; 7) Business incubator technical support; 8) Startup internal innovation

culture; 9) Innovation and entrepreneurship ecosystem; 10) Communication; 11) Process commercialization process; 12) Implementation capacity; 13) Information technology; 14) Product excellence; 15) Incubation participant selection criteria; and 16) Practice monitoring of incubation participants (Xiao and North, 2017; Caseiro and Coelho, 2019; Rakthai et al. 2019; Al Sahaf and Al Tahoo, 2021; Blank, 2021; Konno, 2021; Ssekiziyivu and Banyenzaki, 2021; Habiburrahman et al. 2022; Santisteban et al.2021).

METHODS

This study uses primary and secondary data. Primary data were collected through questionnaires and interviews distributed to startup actors and managers of the Business Incubator IPB University business incubator. The questionnaire consisted of two parts: the Wilcoxon Test comparative analysis questionnaire, which determined the differences in conditions before and after participating in business incubation, and the Interpretive Structural Modeling (ISM) questionnaire, which analyzed the dependency relationships between factors and critical success factors. On the other hand, secondary data were collected through reports from Business Incubator IPB University and relevant literature.

The sampling technique used for the ISM analysis was non-probability sampling with a purposive sampling approach. These respondents consisted of 1) Startup experts and 2) Business Incubator experts who meet specific criteria. The criteria for startup experts are startups that have graduated from business incubation at Business Incubator IPB University, and

their businesses are still running at least one year after graduating from business incubation, while the criteria for business incubator experts are those who have a minimum of five years of work experience at Business Incubator IPB University.

A simple random sampling technique with the Wilcoxon Test was used for startups participating in business incubation. Of the total population of 109 people, the questionnaire was given to 61 people in contact; of the 61 people who successfully filled out the questionnaire, 31 people and 31 people who filled out the questionnaire correctly were 30. This study is based on two research hypotheses. The first hypothesis, H0, states that if startups participate in business incubation at Business Incubator IPB University, the performance of turnover, production capacity, and the number of startup employees will remain relatively high. The second hypothesis, H1, states that if startups participate in business incubation at Business Incubator IPB University, the performance of turnover, production capacity, and the number of startup employees can increase significantly.

Based on the literature study, the factors are divided into two: business incubation success factors based on the perspective of startups and business incubators. The classification of these factors can be seen in Tables 1 and 2.

Success factors in business incubation are further based on the perspective of business incubators (Table 3). Based on the literature study results, it is essential in this research to see the interaction between groups of factors using ISM analysis.

Tabel 1. Expert profil

Education	Age	Work Experience	Position
Doctor	59 Years	>5 Years	Deputy Business Incubator and Partnership at Business Incubator IPB University
Master	45 Years	>5 Years	Business Incubator Management Assistant at Business Incubator IPB University
Undergraduate	28 Years	>5 Years	Product Development and Quality Control at Business Incubator IPB University
Master	39 Years	5 Years	Founder of one of the startups in the health sector at Business Incubator IPB University
Undergraduate	32 Years	5 Years	Founder of one of the startups in agriculture at Business Incubator IPB University
Undergraduate	27 Years	5Years	Founder of one of the startups in agriculture at Business Incubator IPB University

Table 2. Factors in business incubation success based on startup perspective

Factor	Definition	Sources
Network Capacity	The capacity of startups to build, integrate, and reconfigure known and previously unknown knowledge through external relationships and institutions.	(Caseiro et al. 2018; Rakhtai et al. 2019)
Innovative Capacity	The capacity of startups to generate new processes, production, and marketing.	(Rakhtai et al. 2019)
Business Intelligence Capacity	Capabilities developed and explored by the startup that can influence available information.	(Caseiro et al. 2019)
Team Managerial Capacity	A team with high managerial experience uses the business incubation program well.	(Blank, 2020)
Founder Leadership	Founders have business experience that relates to the current business.	(Al Sahaf Tahoo, 2021; Konno, 2021)
Startup Resources	Startup assets are categorized into physical, human, and organizational resources.	(Ssekiziyivu, 2021)
Startup Innovation Culture	The startup's talent pool and ability to develop an innovative business culture according to local demands.	(Santisteban et al. 2021)
Communication	The process of exchanging information, ideas, and messages between startups and business incubators that reflect the value of the product and increase the number of users.	(Habiburrahman et al. 2022)
Commercialization Process	Implementing strategies that involve understanding customer value creation and influencing the strategic processes of service providers.	(Habiburrahman et al. 2022)
Product Excellence	Product excellence that is easy to access and use.	(Habiburrahman et al. 2022)
Implementation Capacity	Knowledge of implementation skills and compliance with startup and product standards.	(Habiburrahman et al. 2022)
Information Technology	Maximum utilization of information technology as a support for the main product and supporting products.	(Habiburrahman et al. 2022)

Table 3. Success factors in business incubation based on business incubator perspectives

Factor	Definition	Sources
Technical Support	Technical support facilities and entrepreneurship mentoring.	(Xiao and North, 2016)
Selection System	Selection of startups for the business incubation program	(Ssekiziyivu, 2021)
Monitoring and Evaluation	System Monitoring of business incubation participants	(Ssekiziyivu, 2021)
Innovation and Entrepreneurship Ecosystem	External relationships that facilitate startup innovation success	(Santisteban et al. 2021)

This research begins by conducting a literature study on the selected research topic. Then, from the literature obtained, it will be known what kind of data is needed in this research. The data needed in this study are then taken in the form of both primary and secondary data, which are divided into two groups of data to determine the influence between factors and data for comparison

of performance results on incubated startups. If the data is fulfilled, the next step is to process the data, which is divided into two, namely data for ISM and data for comparison of startup performance results. After processing the data, the results and conclusions will be obtained. Thus, this research was completed. Research framework in Figure 1.



Figure 1. Research framework

RESULTS

Science Techno Park at IPB University offers startup incubation practices that involve three stages: business pre-incubation, business incubation, and business post-incubation. During these stages, startups can conduct their activities inside or outside the business incubator building.

In the pre-incubation stage, startups undergo a selection process, needs assessment, and action plan. The incubation process is then divided into three stages: 1) The initial stage includes technical training, management, business legality, business planning, and trial production; 2) The development stage includes initial production, market trials, intellectual property rights assistance, and certification and standardization; 3) The advanced stage includes commercial production, market expansion, and network development. In the post-incubation stage, startups must be independent and able to develop a network of partnerships to further

their business development. To complete the process, startups only need to fulfill at least one of the graduation indicators from one of the groups.

The first group includes increasing turnover by at least IDR 3 billion per year. The second group includes achieving an increase in production capacity of at least 50% per year, obtaining product certification and distribution permits, an increase in turnover of 50% per year, an increase in the number of employees of at least 50% per year, and expansion of market area and strengthening of marketing systems. The business incubation period at Science Techno Park IPB University can last up to 36 months, and the start of business incubation at Science Techno Park IPB University can also last up to 36 months.

Based on the turnover, production capacity, and number of employees achieved by startups during the incubation period, Figure 2 describes the average turnover, production capacity, and number of employees

based on the focus areas owned by startups that have completed the incubation period.

Figure 2 shows that the average percentage of turnover performance and production capacity of startups was most significant in the focus area of information technology, with focus areas amounting to 1074% and 1201%, respectively. Then, the percentage of performance of the number of employees with the most significant average percentage in the focus health field amounted to 413%.

Table 4 shows that the data is not normally distributed, and the Wilcoxon Test results are shown in Table 4. Table 4 shows a significant difference in startup performance before and after participating in business incubation at Business Incubator IPB University.

Table 4 shows there is a significant difference in startup performance between before and after participating in business incubation at the Business Incubator at IPB University. The most remarkable average performance improvement was followed by product capacity by 574%, then turnover by 281%,

and employees by 235%. The Wilcoxon test results for each startup performance showed a significance level of <0.05 , so H_0 significance level <0.05 , H_0 is rejected, while H_1 is accepted. This indicates that startups that participated in business incubation at the IPB University Business Incubator experienced a significant increase in turnover, production capacity, and number of employees compared to their performance before participating in business incubation.

These findings suggest that startups should prioritize meeting their output targets to succeed, and if they require additional support, they should extend their incubation period beyond the three- year maximum. It is acceptable to achieve the desired results within a reasonable time frame.

To determine the key success factors for startups in business incubation at Business Incubator IPB University, it is crucial to evaluate their performance first. Once the evaluation is complete, the next step is to analyze the direct and indirect relationships between the success factors and management.

Table 4. Changes in turnover, production capacity, and number of employees after business incubation using the Wilcoxon test

Performance	Percentage	Z	Sig
Turnover	281%	-4.283	.000
Product Capacity	574%	-4.703	.000
Employees	235%	-4.220	.000

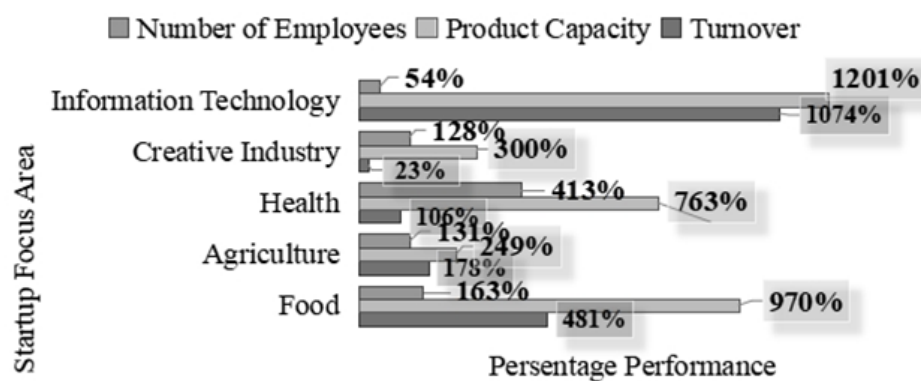


Figure 2. Average percentage change in turnover, production capacity, and number of employees for startups that have completed business incubation

Based on Figure 3, the ISM analysis results have identified four success factors for startups in business incubation at Business Incubator IPB University. These factors are network capacity, business intelligence capacity, founder leadership, and business incubator technical support. These factors fall under sector four, which is an independent factor. Then, startup resource factors, team managerial capacity, monitoring and evaluation system, innovation capacity, innovation and entrepreneurship ecosystem, communication, information technology, and startup internal innovation culture are connecting factors for startup success in business incubation at Business Incubator IPB University. Meanwhile, the factors dependent on the previous factors are the startup selection system, implementation capacity, product excellence, and commercialization process. Furthermore, from the results of the ISM analysis, it is necessary to know the interaction between factors based on the factor level. This will also provide the results of critical factors for startup success in business incubation at Business Incubator IPB University. Factor levels can be seen in Figure 4 .

Based on Figure 4, the results of ISM analysis found that business network capacity and business intelligence capacity are the keys to startup success in business incubation at Business Incubator IPB

University. Then, there is an interaction between startup factors and business incubator factors, namely at level 3, information technology or the ability of startups to utilize information technology is strengthened by technical support from business incubators, and at level 5, namely team managerial capacity, startup resources, and communication are interrelated with the monitoring and evaluation system by business incubators.

These results show that level 1 to level 3 are the top priorities for startup success in business incubation at Business Incubator IPB University. Related to (E.Lubisthani et al. 2022), knowledge transfer from business incubators to startup help the startup succeed. Regarding prioritization, the factors are network capacity, business intelligence capacity, founder leadership, and business incubator technical support, which are independent factors. Then, level 4 to level 6 is the next priority, with the innovation and entrepreneurship ecosystem, monitoring and evaluation system, team managerial capacity, startup resources, communication, and internal startup innovation culture being the reinforcement of startup success in business incubation at Business Incubator IPB University. The factors in the last priority are product excellence, startup selection system, implementation capacity, and commercialization process.

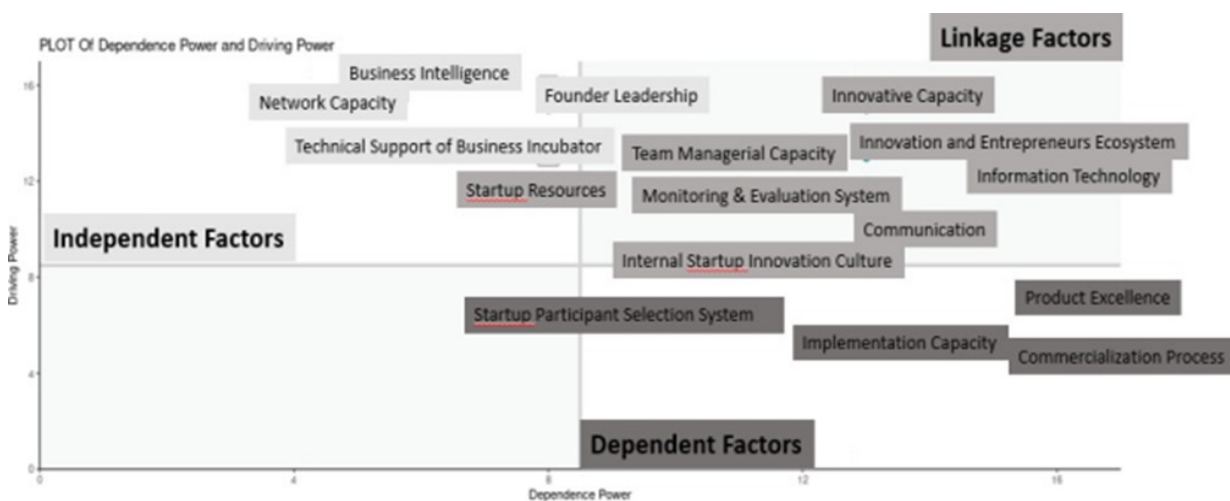


Figure 3. Factor element mapping results

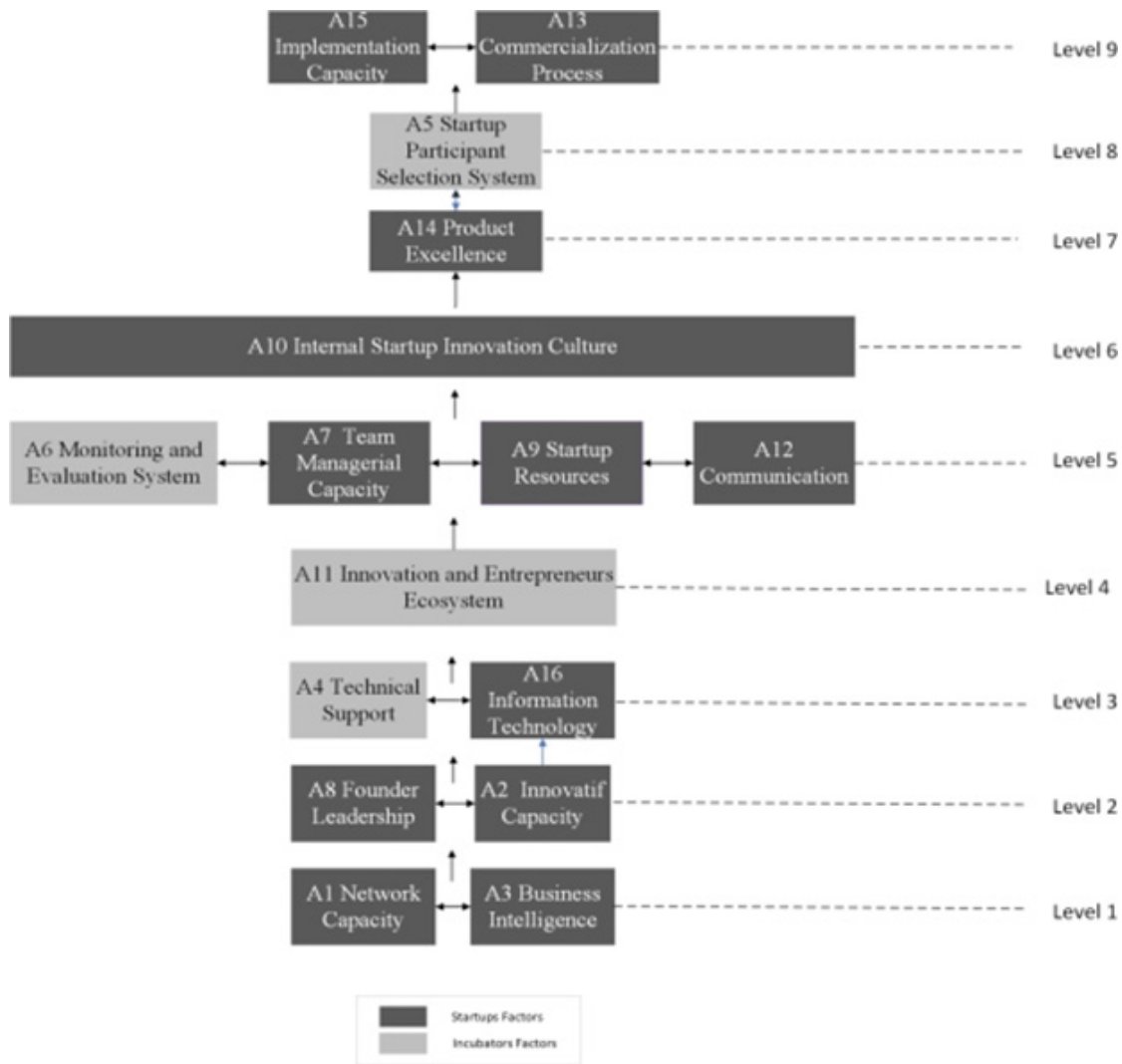


Figure 4. Levels of success factors in business incubation

The results of this study are also in line with (Prihandono et al. 2023) that the determining factors in creating innovation in a university environment are university networks and business partners and according to (Wahyuni and Noviaristanti, 2022) successful business incubators must fill requirements some policies stimulate small and medium enterprise (SMEs) and provide the necessary infrastructure for business, availability of knowledge based on learning and research, formation networks at local, national, and international levels which are facilitated by partnership, community engagement to promote entrepreneurship and cultural change. According to (Games et al. 2021), the effectiveness of business incubators depends on the satisfaction of incubation participants in their interactions with the incubator. The results of the interaction between factors based on the startup

perspective and factors based on the business incubator perspective in this study can serve as a reference for business incubators in accelerating startup growth.

Managerial Implication

At Business Incubator IPB University, the business incubation model for startup success is based on collaboration between startups and business incubators. This model accelerates the success of startups by targeting the needs of the members of business incubation, rather than solely focusing on the business incubators themselves. The mentoring process within the incubation program allows for varying levels of entrepreneurship, which ultimately leads to improved startup performance.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

IPB University's Business Incubator is essential to the startup's success. The use of the Wilcoxon Test in analyzing the success of startup success in business incubation shows a difference in the conditions of startups before and after business incubation at the IPB University Business Incubator; namely, there is an increase in the average performance of startups in the business incubation process. Business Incubator of IPB University, namely, there is a significant increase in the average startup performance on performance on production capacity by 574%, turnover by 281%, and the number of employees by 235%, with an average period of incubation of 12 months at the Business Incubator IPB University. If startups do business incubation at the IPB University Business Incubator, the performance of production capacity, turnover, and the number of employees can increase significantly.

Furthermore, the Interpretive Structural Modeling (ISM) analysis found that the ability to maximize the use of information technology for startups in business incubation is influenced by the technical support of business incubators. Technical support. The team managerial, resource, and communication capabilities of startups in business incubation are mutually reinforced by the monitoring system, and the business incubation is mutually reinforced by the monitoring and evaluation system by the business incubator. Business incubator. Independent factors consist of network capacity, business intelligence, founder leadership, and business incubator technical support. Bridging factors include startup resources, team managerial capacity, monitoring and evaluation system, innovation capacity, innovation and entrepreneurship ecosystem, communication, information technology, and technical support. Entrepreneurship ecosystem, communication, information technology, and internal innovation culture. Dependent factors include startup selection system, implementation capacity, product excellence, and commercialization process. Of all the factors, networking and business intelligence capacity significantly influence the success of startups in business incubation at the IPB University Business Incubator.

Recommendations

The entire business incubator program is a management task. Therefore, policy standardization based on 16 success factors can be a reference for business incubators in accelerating startup growth. This can minimize the excessive gap between the value of the needs of startups participating in business incubation activities and business incubators' compliance and success standards. Further research can be done by analyzing the model in more detail. It is necessary to link the factors important for startup success in business incubation with the various dimensions of the business incubator ecosystem.

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