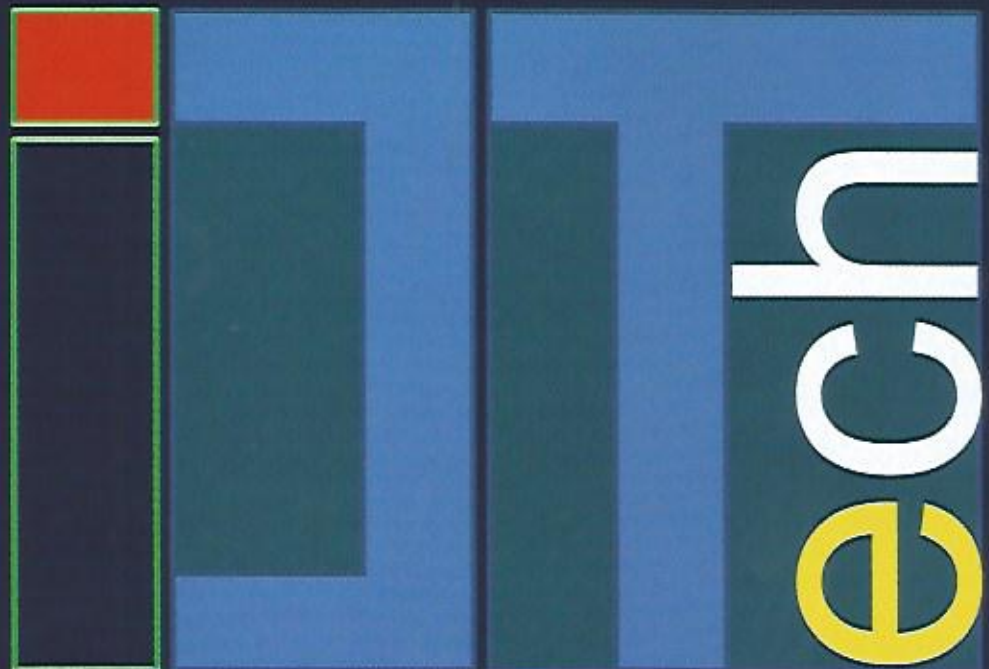


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## CRITICAL SUCCESS AND MODERATING FACTORS EFFECT IN INDONESIAN PUBLIC UNIVERSITIES' BUSINESS INCUBATORS

Lina Gozali<sup>1\*</sup>, Maslin Masrom<sup>2</sup>, Teuku Yuri M. Zagloel<sup>3</sup>, Habibah Norehan Haron<sup>2</sup>, Dahmir Dahlan<sup>4</sup>, Frans Jusuf Daywin<sup>1</sup>, Mohammad Agung Saryatmo<sup>5</sup>, Docki Saraswati<sup>6</sup>, Asril Fitri Syamas<sup>7</sup>, Eko Harry Susanto<sup>8</sup>

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### ABSTRACT

This study aims to examine the effect of critical success and moderating factors in Indonesian public universities' business incubators. The study of business incubators benefits university professors in their roles as managers and advisors, university faculty entrepreneurs and start-ups/tenants in the knowledge transfer and entrepreneurship learning processes, and government officials in effective policy making. For the universities, the incubators serve as a platform for the commercialization of their research efforts. The incubators assist the universities' stakeholders in fulfilling their newly identified responsibilities towards building the nation's economy and giving the faculty members and graduate students the chance to conduct research. Regarding the economic environment, the incubators help create job opportunities, increase the country's economic value, and reduce poverty. This research employed the quantitative method approach, and the data were analyzed using the IBM SPSS version 23 and Smart PLS version 3 statistical software packages. The samples of this research were comprised of 31 business incubator managers from Indonesian public universities. Although there have been previous models about critical success and moderating factors for business incubators in other countries, this study is the first that was conducted in Indonesia and found direct and indirect relationships between critical success factors and moderating success factors for Indonesian Public University Business Incubators. The results of the research demonstrated that good system and infrastructure showed a strong direct relationship with success factors and that information technology showed a strong relationship with the moderating factors, namely age and quality of

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facilities. Furthermore, mentoring and networking showed a strong relationship with the moderating factors good system and infrastructure and that university regulation had a strong relationship with moderating factor credit and rewards. Entry criteria, exit criteria, and funding support showed strong direct relationships to success factors. These findings could improve the management of business incubators in Indonesian Public Universities and allow them to more successful.

*Keywords:* Critical success factors; Indonesian public universities; Moderating factors; University business incubators

## 1. INTRODUCTION

While the term “entrepreneurship” has various meanings, it can be defined as “the process of uncovering or developing an opportunity to create value through innovation” (Macke & Kayne, 2001). According to Feldmann (2014), research on university faculty, staff and entrepreneurial capacities may be extended and investigated in various areas of study. In the long run, business enterprises are crucial elements in determining economic success (Romer, 1994). In addition, during economic recessions, new firms play a crucial role in providing employment, proliferating inventions and driving a country’s economy (Dana, 2004; Engle et al., 2010; Ahmed et al., 2010).

Researchers, policymakers, operators of business incubators and stakeholders do not have an adequate and proper method to monitor and appraise business incubators’ performances in various business sectors and diverse geographical areas. Previous studies lack the theories, methodologies and empirical data to appraise business incubators’ performance and their impact on the economy, even though they are of particular interest to academics and industry practitioners alike (Lewis, 2001; Cornelius & Bhabra-Remedios, 2003). Therefore, business incubators are expected to define their own performance measurements (Voisey, 2006).

According to the National Business Incubation Association (NBIA) (2003), an important factor in the appraisal of an incubator’s performance is the service provision method, but it has not been given enough attention. There is a lack of research about how the services have been extended to the incubators. The incubators goal is to discover whether the services are provided by their managers, boards or mentors, or through internal courses or other methods.

The failure rate in the early stage of start-ups is 90% (Griffith, 2014; Patel, 2015). Data on the rates of business failures are frequently quoted (NBIA, 2003). According to the U.S. Small Business Administration, only 44% of firms stay in business four years after the commencement of operation. This is contradictory to the data gathered by the NBIA, which reports that 87% of graduate firms remained in business ten years after the commencement of operation. On account of the data of failed start-ups, it becomes necessary to identify the critical success factors of building business incubators for public universities in Indonesia. This study’s objective is to identify the critical success factors in those incubators. The focus of this study is on the activities of Indonesian public universities’ business incubators, especially the capabilities and the activities of 31 business incubator managers.

Indonesia's fast growing middle-class market is a fertile ground for start-up enterprises, both local and foreign. This trend presents promising prospects across various industries, including technology, communication, creative and social enterprises. Nurturing a resilient business sector will result in the creation of new jobs and more business prospects across industries, which makes it critical for the economic growth of developing countries (Singtel, 2017).

There is no previous research that addresses the effect of critical success and moderating factors towards a business incubator's success, especially among Indonesian public university business incubators. The main purpose of this research is to identify the direct and indirect relationships between critical success factors and moderating success factors for Indonesian public university business incubators.

A well-known cultural issue is that Indonesians are less initiates their own business ventures. According to a study by the Global Entrepreneurship Monitor, 14.5% of Americans and 7.2% of Singaporeans are keen to start up their own businesses. These statistics stand in contrast to the less than one percent of Indonesians who are willing to do the same (Frazier, 2012).

## **2. LITERATURE REVIEW**

### **2.1. University Business Incubators**

The clients of the University of Central Florida's Business Incubation Program receive extensive benefits regarding business, technology and entrepreneurial support (O'Neal, 2005). The incubator is emphasized the several critical success factors that will ensure a client's success by: (1) incorporating clients into a larger technology development system; (2) encouraging interaction among clients, incubator management and its employees, external parties and the incubator's advisory panel; and (3) giving access to external financing, university resources, economic development agencies in the local community/government and other business support organizations.

Currently, there is a higher degree of support from the university incubators for small firms in the latter's quest for long-term viability and development that involves networking among the entrepreneurs. Several previous studies have investigated the importance of networking for entrepreneurs in detail, and they emphasize the steps towards developing and maintaining relationships within the business setting (Aldrich & Zimmer, 1986; Shaw & Conway, 2000; Hoang & Antoncic, 2003; Neergaard, 2005). Among the advantages offered by the incubator are networks and cooperation, and many businesses would be keen to collaborate with the best of them if they were given the opportunity (Agnete Alsos et al., 2011). Therefore, according to Miller et al. (2011), more attention ought to be given to keeping and preserving knowledge because it would assist in the universities' technology transfer processes, especially on account of the fleeting nature of spin out companies evolving through the process.

### **2.2. Regulation of Business Incubators in Indonesian Universities**

To improve the well-being of Indonesia's citizens, it is necessary for the government to resolve a major challenge, namely unemployment. The Central Bureau of Statistics (CBS) of Indonesia revealed that 5.33% of Indonesia's workforce were unemployed and 11.5% of the population were below the poverty line in 2017. In support of the government's program to alleviate poverty, entrepreneurship projects at public universities are expected to help provide employment, which will also reduce the number of poor people.

In September 2017, the Federal Open Market Committee (FOMC) reported that the normal unemployment rate should be between 4.4% and 5% with a median value of 4.6%. Regrettably, 5.33%, or 7.02 million of Indonesia's population, were unemployed (CBS, 2017). To make matters worse, uneducated people are often used in demonstrations in Indonesia. These people are in dire need of jobs that can help improve their economic and financial conditions. Business incubators, therefore, play an important role because they will help Indonesia resolve some of its economic problems by creating jobs and graduated firms.

With assistance from the Cooperative Department and universities, the government of Indonesia has established the incubators in the country since 1992. This initiative was given a



boost in 1997 by a program known as the Development of Entrepreneurship Culture in Universities, where activities included the New Entrepreneurs' Incubators (Bank Indonesia, 2006).

In addition to Indonesian regulations about business incubators, the terms of business incubators, incubation activity, and incubation participation are governed by the Presidential Regulation number 27/2013, the Development of Entrepreneurial Incubators. Further, in the Ministry of Cooperatives and Micro, Small and Medium Enterprises had introduced Regulation No. 24/Per/M.KUKM/IX/2015 on Norms, Standards, Procedures, and Criteria (NSPK) of the Management of Entrepreneurial Incubators. This regulates the administrative matters of an incubator, including registration, required standards, required services, expected output of an incubator and its tenant and a targeted number of incubators in the country. Some of the parameters regarding the regulation, however, are unspecific, such as the employees' standards of professionalism, the provisions of sufficient facilities and infrastructure and measurements of the incubators' success indicators.

### **2.3. Business Incubator Successful Factor Development**

Most problems that entrepreneurs encounter at the early stages of business development are a lack of legitimacy, experience, tangible resources and accumulated knowledge, which are success factors that allow them to recognize and seize business opportunities. Business incubators do not guarantee graduate tenant company. Evaluating all of the emerging critical success factors, however, can minimize failures once the company enters the business incubator (Lumpkin & Ireland, 1988).

The initial framework by Campbell et al. (1985) emerged with the simple business incubator services and facilities. The business incubator framework started with entry criteria, selection processes, funding and mentoring-networking for tenant business growth.

Smilor (1987) introduced a non-profit business incubator framework whose model implicates the tenant business mission, such as economic development, successful products, a tenant's profit, technology diversification and job creation. Smilor's framework involved support systems, namely administration, facilities and business expertise, from universities and the government. His extensive work strives to ascertain and elaborate upon the different elements of an incubation system. Berge et al. (1989) introduced a new incubation process model that consisted of a pre-incubation process, entry criteria and selection processes and monitoring and controlling processes. The previous models by Campbell et al. (1985) and Smilor (1987) did not introduce the processes and activities from the pre-incubation and incubation processes until successful outcomes were achieved. Mian (1997) provided more detailed processes, criteria, policies and programs and sought the involvement of universities, communities and other stakeholders for the development of a theoretical model to evaluate and manage the university-based technology business incubators' (UTBI) performance. For the first time, Mian introduced the university involvement and developed performance criteria for technology business incubators in the public and private sectors.

The business incubator model is categorized as pre-incubation activities or input (entry criteria), incubation or process and graduation or output (exit criteria) (Costa-David et al., 2002). Costa-David et al. were the first to outline the detailed skill requirements, such as management, finance, business advice, networking and training for start-ups until their graduation. Verman (2004) framework introduced more detailed success factors, namely shared services, facilities and location, financing and support, control of incubators, mentoring-networking, entry criteria and exit criteria, as well as moderating factors, such as age and the quality of facilities for a successful business incubator framework. Voisey et al. (2006) introduced the concepts of hard (profitability, sales turnover, etc.) and soft (business skill improvement, cost saving, etc.)

performance measurements of business incubator practice achievement.

### **3. RESULTS AND DISCUSSION**

Each of the 9 success factors, 3 moderating factors and 115 indicators in this research was investigated in Gozali et al. (2015). The development of a proposed initial framework of successful business incubators in Indonesian public universities from previous business incubator's model and framework was also explored by Gozali et al. (2016). The research was addressed using mixed methods, specifically qualitative and quantitative methods. In the qualitative method, the literature study and expert interviews were conducted in Indonesian public university business incubators to develop the questionnaire (Gozali, 2018). In the quantitative method, data collection, data calculation (reliability and validity) and a calculation of the business incubators' success factors' value were performed. The data were collected from March to October 2016.

#### **3.1. Research Location**

This research was conducted in Indonesia with the participation of 18 Indonesian public university business incubators, comprising Universitas Sumatera Utara, Universitas Andalas, Universitas Indonesia, Institut Pertanian Bogor, Universitas Diponegoro, Universitas Sam Ratulangi, Universitas Brawijaya, Universitas Airlangga, Institut Teknologi Sepuluh November, Universitas Riau, Universitas Udayana, Universitas Gorontalo, Universitas Sebelas Maret, Universitas Jambi, Universitas Padjajaran, Bandung Techno Park, Universitas Negeri Yogyakarta and Institut Teknologi Bandung.

#### **3.2. Research Sample**

The sample of this research is comprised of incubator managers in public universities in Indonesia who oversaw the daily activities of the incubators and graduated tenant companies. The samples consisted of managers had the required understanding and experience in incubator management as well as in handling the relationships among tenant companies within the incubators.

This research saw the participation of 77.4% male and 22.6% female respondents in the age ranges of below 30 years old (3.2%), 30–39 years old (29%), 40–49 years old (19.4%), 50–59 years old (35.5%) and over 60 years old (12.9%). All the respondents were business incubator managers. The respondents' levels of education consisted of Bachelor's degrees (6.5%), Master's degrees (51.6%) and Doctorate degrees (41.9%).

### **4. DATA ANALYSIS AND RESULTS**

#### **4.1. Indicator Reliability Test**

This study employed a mixed-method research design, namely quantitative and qualitative methods, which uses a sequential explanatory design that begins with data collection from a literature review and develops a quantitative study that is supplemented by data from in-depth, one-on-one interviews. The status of the quantitative aspects of the research was considered higher than the qualitative because the interviews with the expert were based on empirical data, which was collected first. The quantitative study continued with reliability and validity tests, research hypotheses tests and a structural model test. This research used the case study as a part of the qualitative method to examine the differences among public university business incubators in Indonesia.

The data was analyzed using statistical software IBM SPSS version 23 and Smart PLS version 3. The Cronbach alpha values that were calculated are larger than 0.6 (Hair et al., 2012). All of the reflective latent variables, therefore, have high levels of internal consistency reliability. Composite reliability that was calculated is larger than 0.7, which confirms the composite

reliability (Bagozzi & Yi, 1988). Furthermore, convergent validity, such as the average variance extracted (AVE) of the latent variables should exceed the acceptable threshold value of 0.5 (Bagozzi & Yi, 1988). Some indicators showed an unacceptable reliability test and they were removed from the research. The indicators that did not meet the threshold were FAC 1 (business taxes), FAC 2 (risk and management unit), FAC 7 (export development assistance), FAC 8 (writing financial report, ratio and balances), SBSE 1 (audio visual equipment), SBSE 10 (office hour answering service), SBSE 11 (air conditioner), SBSE 12 (cleaning), SBSE 13 (maintenance), SBSE 14 (custodial service), SBSE 7 (filing), SSF 10 (logistic), SSF 5 (conference room), SSF 6 (meeting room), SSF 7 (furniture and equipment rental), SSF 8 (canteen) and SSF 9 (shipping and receiving).

#### **4.2. Indicator Validity Test**

According to Fornell and Larcker (1981), the square root of each latent construct's AVE could determine discriminant validity, if this value is greater than other correlations among the latent constructs. The square root of AVE for each construct was compared with the correlations between all pairs of latent constructs. If the square root of the AVE for each construct is larger than the correlations between all pairs of the constructs in the model, then the model has enough discriminant validity. When the square root of the AVE is greater than the correlations between the constructs, the level of validity of the constructs is considered satisfactory. As a result, each construct was considered as having high validity. All the square roots of the AVE exceeded the correlation values between other constructs and all the square roots of latent variables in each column. The results, therefore, showed satisfactory discriminant validity.

#### **4.3. Effect Size Value**

The effect size was calculated to evaluate the impact of a predictor construct on an endogenous construct. Credits and rewards, entry criteria, exit criteria and funding support had a strong effect size on the success factors. The effect sizes of funding and support to success factors, good system and infrastructure to success factors, information technology to the quality of facility and mentoring-networking to good system and infrastructure were strong. The correlation between university regulations and credits-and-rewards was strong. Table 1 and Figure 1 show the effect size of business incubator success factors.

The success factors of Indonesian public university business incubators are: the ability of the business incubator, entry criteria, exit criteria, funding and support, government support and protection, incubator governance, mentoring and networking, system infrastructure and university regulation.

It is necessary for knowledge-intensive firms to possess the capability, competency and the right attitudes at both individual and firm levels to convert new thinking, technologies and creations into economic and social value by using pioneering business models (Byers et al., 2010; Mitchelmore & Rowley, 2010; Romano et al., 2014).

The importance performance map analysis, as presented in Figure 2, shows the strong correlations between mentoring-networking and good system and infrastructure as well as university regulations and credits-and-rewards and between information technology and other services and age-and-quality facilities.

Table 1 The effect size business incubator success factors

	Age and Quality of Facilities	Credits and rewards	Entry Criteria	Exit Criteria	Funding Support	Good System and Infrastructure	Success Factors
Age and Quality of Facilities							0.044
Credits and Rewards	0.150						
Entry Criteria							
Exit Criteria							
Financial Accounting Consultation	0.006						
Funding Support							
Good System and Infrastructure							1.114
Government Support and Protection		0.003					
Incubator Governance		0.018					
Information Technology	0.727						
Management Human Resource and Assistance	0.280						
Marketing Assistance	0.004						
Mentoring-Networking							0.321
Physical Logistic Facilities	0.047						
Professional Business Service and Etiquette	0.009						
Shared Business Service and Equipment	0.232						
Success Factors			1.409	1.076	1.377		
System Infrastructure						0.035	
University Regulations		0.302					

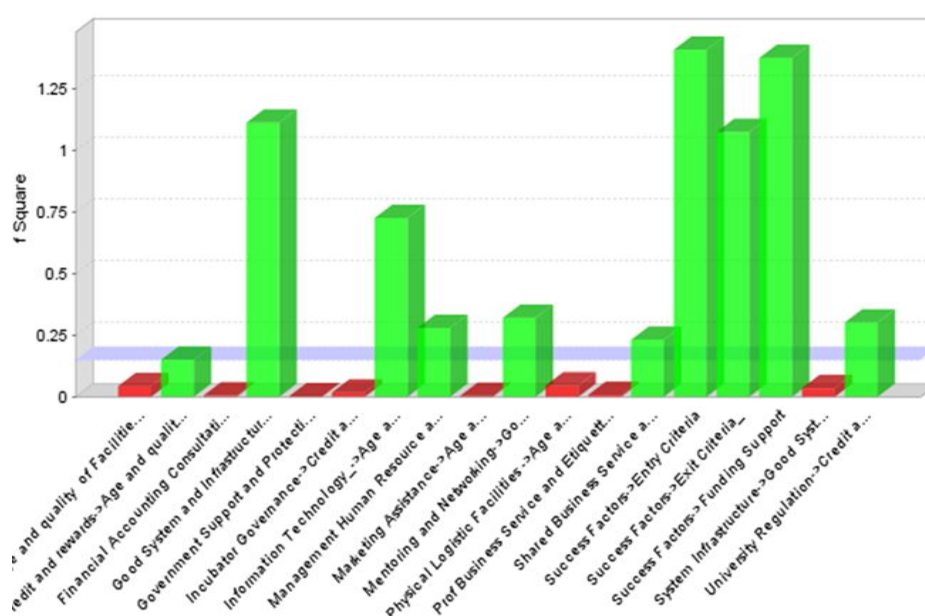


Figure 1 Effect size of business incubator success factors

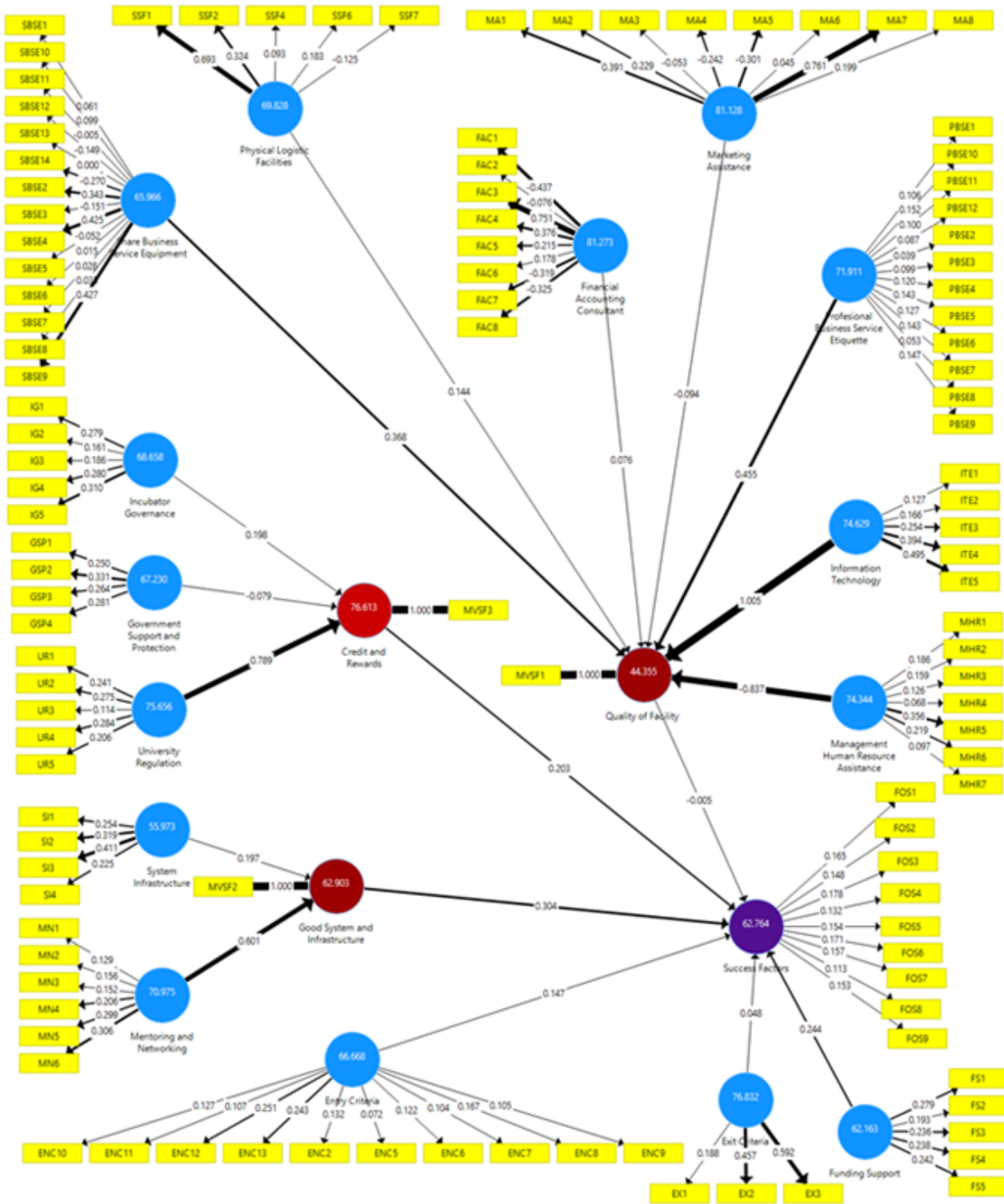


Figure 2 Importance performance map analysis of the factors of successful business incubators among Indonesian public universities

**4.4. Structural Path Coefficient**

After the model was entered into the SEM software package and the analysis was conducted, the result of the fitness measures indicated whether the research hypotheses were accurate or not. The ratio of each parameter to its standard error corresponded to a z test for the significance of the relationship with  $p = 0.05$  and a standard deviation of 1.96 (Jackson et al., 2005).

The strong effect of critical success factors and moderating factors in business incubators for Indonesian public universities are: (a) credit and rewards to age and the quality of the facilities; (b) information technology to age and the quality of the facilities; (c) mentoring-networking to good system and infrastructure; (d) success factors to entry criteria, exit criteria, and the funding support; and (e) the universities' regulations to credits and rewards factors (refer to Table 2).

Table 2 Structural path coefficient model for this research

No.	Critical Success Factors	T statistics	P values
1	Age and quality of facilities → Success factors	0.836	0.404
2	Credit and rewards → Age and quality of facilities	1.513	0.131
3	Financial accounting consultation → Age and quality of facilities	0.282	0.778
4	Good system and infrastructure → Success factors	4.996	0.000
5	Government support and protection → Credit and rewards	0.226	0.821
6	Incubator governance → Credit and rewards	0.435	0.664
7	Information technology → Age and quality of facilities	2.786	0.006
8	Management human resource & assistance → Age and quality facilities	1.241	0.215
9	Marketing assistance → Age and quality of facilities	0.136	0.892
10	Mentoring and networking → Good system and infrastructure	2.738	0.006
11	Physical logistic facilities → Age and quality of facilities	0.656	0.512
12	Prof Business Service and Etiquette → Age and quality of facilities	0.267	0.789
13	Shared business service and equipment → Age and quality of facilities	1.289	0.198
14	Success factors → Entry criteria	11.433	0.000
15	Success factors → Exit criteria	6.152	0.000
16	Success factors → Funding support	10.521	0.000
17	System infrastructure → Good system and infrastructure	0.819	0.413
18	University regulation → Credits and rewards	2.354	0.019

## 5. CONCLUSION

The results of this study demonstrated that the effect of critical success factors, namely entry criteria (Berge et al., 1989), exit criteria (Berge et al., 1989), funding support (O'Neal, 2005), mentoring-networking (Agnete Alsos et al., 2011; Miller et al., 2011) and university regulations (Mian, 1997), directly affect the business incubators for Indonesian public universities. Furthermore, the results showed that the moderating factors, namely credit and rewards (O'Neal, 2005), good system and infrastructure (O'Neal, 2005) and the age and quality of the facilities (Verman, 2004), significantly affect university regulations, mentoring-networking and information technology, respectively.

A good system and infrastructure showed a strong relationship with the success factors, and information technology showed a strong relationship with the moderating factors, especially age and the quality of the facilities. Mentoring and networking had a strong connection to the moderating factors, namely good system and infrastructure, and university regulations had a strong relationship with the moderating factor of credit and rewards. It cannot be denied that entry criteria, exit criteria and funding support are associated with the success factors. This finding could improve the management of business incubators in Indonesian public universities and make them more successful. These research findings may persuade Indonesian public university business incubators to give more attention to the development and management of the business incubators on their own.

This study has ascertained the effect of critical success factors and moderating factors for the business incubators in Indonesian public universities. Voisey et al. (2006) utilized business incubator measurement to manage business incubators performance, economic policymakers and stakeholders of the importance of learning strategies. Universities' business incubator

regulations and environments enable and encourage the start-ups to exchange ideas and achieve success in business creation. The entry criteria are important not only to select start-ups to implement their business ideas, but also to support business learning communities in entrepreneurship learning programs.

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