The Impact of Start-up Business Ecosystem and Lifecycle on Start-up Creation Process – Case Study of Indonesian Software Technology Start-up

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Abstract. Developing new start-ups with higher maturity presents a higher degree of utilization of the practices, methods, and tools to perform in an increase of business start-ups. The purpose of this paper is to explore and analyze how the characteristic start-up ecosystem in every lifecycle. This research applies a qualitative study based on explanatory multiple-case which data are collected during an in-depth case study of understanding the start-up ecosystem and lifecycle in an Indonesian software technology start-up, including interviews and participant observations with start-up founders. This study contributes to identifying and exploring start-up businesses companies through conceptual understanding eight of the critical start-up ecosystem and start-up lifecycle processes which are rarely found by other researchers. The result of this study provides further insight about characterize of start-up businesses from multiple-case case study start-ups. This study found that each stage of the start-up lifecycle had a different focus on enhancing the ecosystem. There may be a needed next step to identify, explore and assess more components in a larger group of innovative technology start-up businesses in developing a new start-up. This paper also suggests some implications, both practical and theoretical, that will be able in detail to use in future research.

Keywords: *start-up business; start-up ecosystem; start-up lifecycle; start-up creation*

1 Introduction

During the rapid development of technological innovation, most young people made innovations and unique products in technology, usually called start-ups. The term of start-up defines as new ventures to drive economic development from the country includes a change of innovation and support new opportunities of the business with a business model [2]. In Indonesia, many start-up technologies come up every year with different technologies and categories. The data from start-up ranking, Indonesia have more than 2 thousand start-ups and become big five countries where start-up been developed. Indonesia also has several start-up Unicorn such as Bukalapak, Tokopedia, Go-Jek, Blibli, Traveloka, etc. [27].

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The previous study found that in Indonesian are for example Yogyakarta city, the start-up performance conduct success factor depend on team, funding and business model. The researcher gathered information by interviewing three start-up digital within an established start-up in three years [17]. However, this still a gap in how to measure for new start-ups currently establish to measure their performance and gain resilience with understanding start-up creation process for more than one year.

Despite start-ups ability, many early-stage start-ups fail within two years for a number of reasons, including a lack of a problem-fit solution for their project and a failure to learn from failures through consumer and product development [23]-[16]-[6]. This phenomenon is also happen in the Indonesian context which many start-ups had been developed but their failed because lack of technology commercialization process that is from product development until establish also miss growth of development process [4]-[20].

The suitable ecosystem and understand lifecycle of start-ups are needed to maintain and construct resilience of start-ups for every stage [25][29]. In particular, this would have an effect on the need for the start-up of software processes. A separate life-cycle start-up phase to help start-ups define acceptable infrastructure specifications in particular circumstances [1].

This research conduct in a sample of two software start-ups company in Indonesia which have passed bootstrapping stage, seed stage and creation stage with age more than one year. The aim of this paper is to investigate the software technology start-up which can be adapted by a new venture or a start-up with an understanding of the characteristics of start-up creation with combination of ecosystem and lifecycle.

This article shall be divided into the following parts. In the second part, the theoretical context underlying this study and the research theories are discussed. The third and fourth parts offer a description of the methodology and results of the data analysis. The fifth section contains a conclusion and practical implication, and the sixth section discusses the directions for future research.

2 Literature Review

2.1 Start-up Creation Theory and Concept

Start-up which firm with innovation and creativity in entrepreneurship defines by Joseph Schumpeter (1937), Schumpeter argue that the role of entrepreneurship with creativity or innovation to mix the productive factors that put these factors together and organize the productive capital in the economic development. In

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1984, Van de Ven define start-up is based on characteristics of the founder and promoter of a new organization.

However, the first the word of start-up initially appeared in the proceeding article by Errand Camel (1994), start-up product creation is motivated by the following five objectives: minimizing time-to-completion, enhancing innovation/features, optimizing efficiency, minimizing product expense, and minimizing the cost of development. Start-up is the early stage of an entrepreneurship enterprise in which founders are already looking for a business model that is replicable and scalable with [3].

With fastest growing in ICT sectors that make many start-ups have emerged. Start-up is an entity or team initiative planned to alter their world by creating economic profit, typically through creativity. The development of theory start-up in 2010 by Steve Blank, a start-up define as a temporary organization looking for a scalable and repeatable business model. In 2011, Eric Rise described a start-up is any organization aiming at creation of new product or service in conditions of extreme uncertainty.

Start-ups are also define as ventures in the process of finding, creating and executing a sustainable and scalable business model to take advantage of market opportunities [12]. Start-ups chances of success can be significantly improved by creativity and innovation [17]. Start-ups practices vary considerably from those of existing companies or from new ventures [9].

To become a successful start-up that founders must manage and increase their knowledge in order to develop and believe the start-up they have been created (start-up creation) [10]. Moreover, the other researchers found that weak organizational structure, inefficient project management, ineffective cooperation with non-governmental sectors, failure to collaborate with stakeholders, and conflicting political behaviors [32]. Start-up creation process can see in the start-up ecosystem and start-up lifecycle.

2.2 Start-up Ecosystem

In an area situated in a particular place, a start-up ecosystem exists. Eight critical aspects have arisen that have an impact on start-ups (with an emphasis on software-intensive products): entrepreneurs, financing, the economy, technology, intellectual resources, schooling, demographics, and supporting factors. Founders and developers turn their visionary concepts into corporate strategies to set up their start-ups in the design process [29].

Supporting influences, such as incubators and accelerators, will affect the growth of MVP by delivering the requisite business expertise and education to young

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entrepreneurs to build the best match for the product market [29]. Managers better consider dynamic capacities, the development of innovation networks and the emergence of innovation environments and incorporate them into innovation management efforts and manager action feedback to increase the success of innovation in their organizations [14].

Understanding in the start-up ecosystem in reducing barriers to innovation can help start-ups and policymakers identify the key stakeholders and resources needed to sustain innovations for start-ups and set priorities appropriately [18]. A start-up ecosystem strongly involves by the background of the development manager, the background of the founder, and market requirements in a successful start-up [21]. Founders and developers turn their visionary concepts into corporate strategies to set up their start-ups in the design process [29].

2.3 Start-up Lifecycle

On the other hand, understanding the start-up lifecycle process can describe which entrepreneurs prepare to launch their products, find potential markets, and brush up their business plans [15]. Typically, a start-up begins with 2-6 investors, but more workers are expected as the company scales. In fact, this will impact the necessity of the start-up for software processes [1]. A different lifecycle a start-up stages to help start-ups in specific situational contexts identify appropriate requirements engineering techniques.

The process of the life cycle of companies in which entrepreneurs prepare to launch their enterprises, find potential markets and brush up their business plans [15]. A significant relationship between the ability of a start-up to raise funds and the level of education of the CEO, causal relation is even stronger as the CEO holds an MBA [28]. The number depends on the point of their respective life cycle or the company's age. Typically, a start-up begins with 2-6 investors, but more workers are expected as the company scales. In fact, this will impact the necessity of the start-up for software processes [1]. A different lifecycle start-up stages to help start-ups in specific situational contexts identify appropriate requirements engineering techniques.

The life cycle of a start-up divides into three stages from the bootstrapping stage, seed stage, and creation stage. In bootstrapping stage, the start-up demonstrating product viability, cash management capabilities, team building and management and customer acceptance into position the venture for success. In the seed stage, the start-up is marked by team work, product creation, business penetration, venture valuation, the quest for support systems such as accelerators and incubators, and average start-up growth investments [25]

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The seed stage is a mess for most start-ups and is viewed as extremely unpredictable. In this process, a great deal of start-ups collapse. Since they did not find funding structures and would turn to a low profit business with a low performance rate in the best-case situation. In the creation stage, the start-up stage of development happens as the organization sells its goods, enters the market, and recruits first workers [25]. At the end of this point, the organization/company is created and the primary option for funding the company is assumed to be corporate finance. Over financing the venture, venture capital may encourage the development process.

3 Methodology

3.1 Research Strategy

This research applies qualitative study based on explanatory multiple-case which data are collected during an in-depth case study of understanding start-up ecosystem and lifecycle in an Indonesian software technology start-up, including interviews and participant observations with start-up founders. A qualitative method in research describe as an unfolding model that occurs in a natural setting that allows the researcher to establish a degree of detail from a high level of participation in real experience [8]. In qualitative analysis is less formal because it formulates and develops new theories [19]. A qualitative study can also be defined as a successful paradigm that exists in a natural environment that allows the researcher to establish a degree of detail by being highly active in real experience [8].

A method that can deeply describe and analyze a certain specific phenomenon based on abundant qualitative data [12]-[13] to answer and address "how start-up creation process with understanding start-up ecosystem and lifecycle" question [31]. The empirical evidence including exploratory participant observations, interviews, and also secondary data, assisting in generating an empirically grounded understanding of software technology start-up in each stage of start-ups lifecycle.

Each participant was consulted about the objectives within the four perspectives of the start-up ecosystem from each stage of the start-ups lifecycle. The result of our research is to build awareness, with the goal of researching the topic using a bottom-up rationale, as information on the subject is scarce and we want to seek in-depth information.

The researcher concept into several sub-research question to understand and address the research main question and objective (see Table 1).

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Table 1 Sub-research question of ecosystem and stage start-up.

Themes	Sub-research question
Entrepreneur	How do the individual characteristics of founding team members?
Technology	How does technology affect the development of the product?
Human Resource	What skill of each member in the development of the product?
Finance	How does the start-ups found the capital?
Education	What education level of each member start-up?
Supporting Factors	What supporting factors of development start-up?
Demography	What are the characteristics or personas of the start-up market?
Market Adaptation	What channel to reach start-ups product?

3.2 Data Collection

To conduct a research study, data are collected using observations, interviews, and documents online such as website, Instagram, Facebook, etc. from a random sample of a software technology start-up to examine the start-up creation process.

The data were collected incrementally in three iterations. First, data would collect by interviews from each member of start-ups. Second, the researcher would observe how participants answer the question based on why their think, motivation, and tone of voice. Then, the cross-check from each document was done to maintain a precise chain of evidence and seek data saturation from start-up PT. XXX and PT. YYY where the start-ups established from an incubator or accelerator program.

3.3 Data Analysis

The data were interpreted inductively using the concept of grounded methodology and using natural language coding and classification (Miles and Huberman, 1984). Both empiric datasets is divided into the qualitative data processing program and open-coded at the level of the smallest sense units to compare technology software start-up company (Strauss and Corbin, 1998). The codes include a wide range of topics of the start-up ecosystem, such as entrepreneur perspective, technology innovation, financial funding, market adaptation, human capital, supporting factors, education, and demography. To limit the broad categorization process, the data were arranged using the codes and categories related to the lifecycle-ecosystem start-up relationships.

4 Results and Discussion

In this section, we discuss each of the sub-questions mentioned (see Table 1) to provide a matrix displaying information on each stage of the start-up lifecycle as identified during data analysis. Furthermore, (see Table 3) there are differences in comparisons between start-ups. Developing new start-ups with higher maturity in innovation level, ecosystem, and lifecycle stage level, present a higher degree

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of utilization of the practices, methods, and tools to perform in an increase of business start-ups.

4.1 Description of Study Units and Interviewees

The units we studied in the sample of a start-up based on random sampling which can represent each start-up stage regarding detail information of each start-up (see Table 2). Each software technology start-up is characterized into two categories that accelerator and incubation program. While in the incubation program mostly based on university spin-off. In the university spin-off the start-up originated based on research of university student (academic research) where most of founder had background in development software or business. Furthermore, in the solo entrepreneur, the start-up developed a product with looking at some phenomenon that impacts people.

In the interview, we conducted different role of each member start-ups that are the vice president of technology and business director. These interviewees minimum had one year of an established start-up company to understand of early-stage start-up, entry the market, and corporation perspective in Indonesia region. The effect of ecosystem start-up will enhance to understand lifecycle start-up at each stage.

Table 2 Interviewee Detail Information.

Start-up	Interviewee Position	Employee Size	Business Domain	Age (Years)	Product Type	Incubator/ Accelerator
PT. XXX	Vice President	113	Workforce Solution	3	Mobile + Website	Antler
PT. YYY	Business Director	10	Agricultural Technology	5	Mobile	LPIK

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Table 3 Table 1 Start-up Ecosystem and Lifecycle Each Stages.

Start-up Ecosystem	Start-up Lifecycle Stages					
Elements	**Bootstrapping**		**Seed**		**Creation**	
	PT. XXX	**PT.YYY**	**PT. XXX**	**PT.YYY**	**PT. XXX**	**PT.YYY**
Entrepreneurship	The founders had previous experience in development start-up	The founders had not experience in start-up development	The founders had to looking some potential accelerator which outside Indonesia	The founders had to looking some potential incubator that can support research	The founders tried to find venture capital	The founders tried to find some event to get grant
Technology	The company created technology based on website with minimum variable	The company created the technology with hardware development	The company added some features in the website product	The company add some features in the mobile product	The company developed product for mobile	The company developed website product for marketing
Human Capital	The competence and commitment of three funder	The competence and commitment of eight funder	The founders found team members based on skill selection	The founders found team members based on skill selection in friends first	The founders enlarged team members based on skill selection in every division	The founders found team members based on skill selection
Financial Funding	Accelerator grant	Incubator grants	Accelerator grant	Grants	Venture capital series A	Grants
Education	The founders from the same master degree program	The founders from different program	The team members had different educational level	The team members had different educational level	The team members had different educational level	The team members had different educational level

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Supporting Factors	Networking and community	Incubation	Accelerator	Incubation	Venture capital	Lecture and Incubation
Demography	Company that needs man-power of logistic	Farmers	Company that need market research	Farmers	Company that need selling management	Farmers
Market	Community	Incubation	Webinar	Events	Digital Marketing	Events

4.2 Ecosystem effect on development of lifecycle start-up

In the bootstrapping stage, a start-up established mostly less than 2 years where position the development company by demonstrating product viability, cash management capability, team bonding and management, and customer acceptance (Brush et. al., 2006). In the bootstrapping stage, among start-ups that are no different element ecosystem, but the factor of entrepreneurship of each founders influence of growth start-up. The founder in PT. XXX had previous experience in development product which can contribute to the next stage rapidly. Moreover, technology and supporting factors also becomes critical factors in develop start-up ecosystem in the bootstrapping stage. It can see that PT.XXX which joined accelerator program in Singapore had more opportunity and assistance from these programs. Although PT.YYY still received some assistance from the national incubator. (see Table 3).

The seed stage is defined by the initial capital used for the manufacturing and/or service of the commodity. Therefore, the entrepreneur finds funding systems such as accelerators, incubators, small business growth centers and hatcheries to facilitate the process. This stage is often characterized by teamwork, prototype creation, entrance into the market, valuation of the company [25]. In the seed stage, the impact of education of each member and human capital will increase start-up growth. The start-up needed to have a good human capital resource which can be found team based on skill and education.

In the creation, stage start-up is established, and corporate finance is the primary option for its funding. Venture capitalists could promote the stage of development by financing the venture [25]. In the creation stage, the individual of the company founders had a different program which PT. XXX had to found some venture capital while PT.YYY still focus on some event to enter the market. Then we can conclude, in this stage, the start-up should focus on the found venture capital

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(financial funding), understood demography, and enter the market (market adaptation).

Finally, this result of this comparative study, we learned how eight element of start-up ecosystem can be different among start-ups. Even though one start-up was established earlier, start-up ecosystem factors such as entrepreneurship, technology, human capital, financial founding, supporting factors and the market can trigger start-ups to develop faster. The experience of start-up founders and start-up supporting factors is one of the important keys in the development of start-ups in each stage from bootstrapping, seed, and creation stage.

5 Conclusion

This study shed light on how the start-up ecosystem related to each stage of the start-up lifecycle. Which two factors from the start-up ecosystem are entrepreneurship and supporting factors that influenced by start-up growth rapidly. The result of this study also provides further insight about characterize of start-up businesses from multiple-case study start-ups. Moreover, future research could be a needed next step to identify, explore and assess more components in a larger group of innovative technology start-up businesses in developing a new venture/start-up which can come from a university spin-off.

5.1 Implication for Practice

The data identified and analyzed in this analysis were from real cases of software technology start-ups ecosystem. Practitioners may use our findings in the following steps:

1. Experienced founders of the start-up influenced in the start-up ecosystem for every stage.
2. The founders of new start-up business must find appropriate business incubator or accelerator to assist develop product rapidly and linked to some potential investors.
3. Our study discusses that the role of entrepreneurship and supporting factors has an important role in start-ups ecosystem.

5.2 Implication for Research

We conducted comparative case study were analyzed to understand the role of start-up ecosystem in each stage of start-up lifecycle. Our results have the following implication for researchers:

1. Researchers should carry out an in-depth evaluation.

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2. Human capital plays a role in supplying the necessary business and technological expertise to the process. Researchers should investigate how potential members may learn the new skills required to improve the product more efficiently.

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