

# Mutualistic Interaction Model of Start-up Communities and University Business Incubators: A Research Agenda

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## Abstract

The existence of intermediary institutions such as business incubators has become one of the solution models to support the creation of start-up companies. On the other hand, the role of start-up communities in supporting the entrepreneurial ecosystem cannot be ignored. However, very few discuss the synergistic role of the start-up communities with business incubators, especially in developing ecosystems. This study departs from the hypothesis that start-up communities around the university business incubators institution will increase the incubator's capacity to carry out its obligations to provide services to its fostered start-ups. In various situations, the start-up communities have fulfilled some of the needs for information sharing, network development, and the basic skills, etc., needed by start-up teams. On the other hand, University Business Incubators (UBIs) tend to be equipped with various facilities, access to funding, and access to formal networks in carrying out their mission. There are still few studies that discuss the interaction between these two agents in the innovation ecosystem. Ecosystem maturity is one of the keys to empowering start-up productivity, but there are more challenges in developing ecosystems. Therefore, the empowerment of reciprocal synergies between start-up communities and incubator institutions in developing ecosystems needs to be studied. This paper proposes a research framework and research agenda to fill this gap.

## Keywords

Start-up community, entrepreneurial ecosystem, university business incubator, and mutualism interaction model.

## 1. Introduction

The transformation of universities into entrepreneurial universities is proliferating in various places and is increasingly strengthening its contribution to the knowledge economy (Deiaco et al. 2012; Guerrero et al. 2015). The development of the entrepreneurial university is also driven by the need to develop innovation, improve the welfare of higher education institutions, and increase regional economic growth (Etzkowitz et al. 2000). This drive has transformed universities to be more open to entrepreneurship (Guerrero & Urbano 2012), no longer an

ivory tower but increasingly engaging in entrepreneurial activities with industry partners (Zhang et al. 2016). Universities are shifting from the traditional role of teaching and research to a more advanced and complex role in supporting academic entrepreneurship (Lerner 2005; Urbano & Guerrero 2013). The entrepreneurial university has finally turned into an integral part of the university management strategy (Guerrero et al. 2016).

In the 1980s, the concept of a business incubator to support the commercialization of technology and an entrepreneurial ecosystem was applied in several universities in America (NBIA 1992). This initiative then spread to become ubiquitous parts of the world (Mian 1996). The evaluation of the performance of university business incubators also continues to grow (Bergek and Norman 2008). The role of business incubators to support new businesses has high potential, building an innovation-based regional economy (Hackett & Dilts 2004). Currently, business incubators are also initiated by universities, the government, the business sector, and venture capital companies. The existence of a business incubator strengthens the ecosystem in creating new ventures.

Technology-based start-up development is complex process (Muñiz-Avila et al. 2019). A start-up is an entity designed to build products and business models in uncertain situations (Ries, 2011). Therefore, many factors of start-up failure before launch vary greatly (Cantamessa et al. 2018). This situation is often referred to as the valley of death (Beard et al. 2009). For this reason, the presence of intermediaries who provide support to start-ups so that they can launch their business is essential. Incubators and accelerators are common practices to fill this role. There has been a lot of research and knowledge about this. Formal incubator institutions, including incubators in universities, generally have the opportunity to get a lot of incentive support and capacity-building programs from the government. In contrast, most of these are not accessible to start-up communities whose organizational forms are non-formal.

On the other hand, business communities, both very small and large, cannot be ignored for their contribution to the entrepreneurial ecosystem. As the entrepreneurial ecosystem model proposed by Spigel and Stam (Spigel 2017; Stam & Spigel 2018), the community is part of the social capital in the entrepreneurial ecosystem. Feld & Hathaway (2020), through their "Boulder Thesis," explained that the business community is one of the critical pillars in building a successful entrepreneurial ecosystem. For example, the initiative to open networking centers and entrepreneurship events from universities for local entrepreneurial communities has proven to be a place for knowledge exchange and commercialization of research results. (Belitski & Heron 2017). In practice, various community activities support business development for its members, such as training in developing new skills, mentoring, sharing information, networking cooperation, access to funding, and various other things that support the growth of its start-up members.

However, even though the roles of the communities in the valley of death are actual, the role of the start-up communities, especially its mutualistic relationship with higher education incubators, has not been extensively and empirically investigated. There is very little research exploring the role of these communities in the growth of startups and their contribution to the emerging entrepreneurial ecosystem. This study reviews previous studies related to communities' roles in the start-up ecosystem, especially in the corridor of its relationship model with university business incubator institutions and their reciprocal relationships. This study also provides recommendations for future research agendas that will be applied to the developing ecosystems, in this case at some universities in Indonesia and the surrounding start-up communities. Initial studies on ecosystems in Indonesia were conducted through available information sources such as the internet, report documents, and publications on related studies.

## **2. Literature Review**

### **2.1 The complexity of start-up development and its ecosystem**

Researchers and academics have suggested that entrepreneurship with the ecosystem influences it is a complex process (Roundy et al. 2018; Stam & Spigel 2018). Previously, entrepreneurial ecosystems have been the subject of research without focusing on complex interactions between agents (Auerswald 2015). Therefore, approaches in entrepreneurship research need to consider the use of complexity science. Among the characteristics of a complex process are multiple actors with multiple objectives. The process of developing start-ups in higher education involves at least the founders, inventors, investors, a team of entrepreneurs, intermediaries, and the community. Each actor has a different role and purpose. Therefore, creating a start-up is a complex process (Muñiz-Avila et al. 2019).

As intermediary institutions, business incubators have many tasks to support the business development of their tenants. The roles of business incubators are included providing facilities, coaching, and network development (Peters et al. 2004). Provision of physical infrastructure includes tenant rooms, equipment, administrative facilities

such as internet lines, telephones, in certain cases laboratories, conference facilities, and so on. The coaching role includes coaching and mentoring, training, and educational workshops. Seminars or programs are offered either for a fee or free for tenants. Network development provides access to tenants, including administrative, management, financial, legal, insurance consulting, and scientist and academics services, either paid or free. In business development, in certain cases, BIs assist tenants in the maturation of ideas, product prototype development, formulation and validation of business models, and finding early adopters.

However, the success of a business incubator in carrying out its role cannot be separated from the support of the entrepreneurial ecosystem around it. As Stam & Van de Ven (2021) state, companies with high growth in an area usually have closely related to the quality of their Entrepreneurial Ecosystem. Isenberg (2011) emphasizes the importance of a network of entrepreneurs on the maturity of the entrepreneurial ecosystem. The dynamics of the ecosystem influence the business validation process of a start-up business.

There are various definitions of the Entrepreneurial Ecosystem from many researchers. According to Stam & Spiegel (2018), the entrepreneurial ecosystem is a combination of interdependent actors and factors that are coordinated in such a way as to produce productive entrepreneurship in a particular area. Feld & Hathaway (2020) define a start-up community as a group of people who are fundamentally committed to helping entrepreneurs achieve success through interactions, attitudes, interests, goals, shared identities, partnerships, collective accountability, and place management. Various Entrepreneurial Ecosystem Models, including discussing the business community's role in the ecosystem (Isenberg 2011; Stam & Spiegel 2018). In this case, both the business incubator and the business community are components of the entrepreneurial ecosystem. They are a system within a system. The interaction between these two components also determines how productive the ecosystem is.

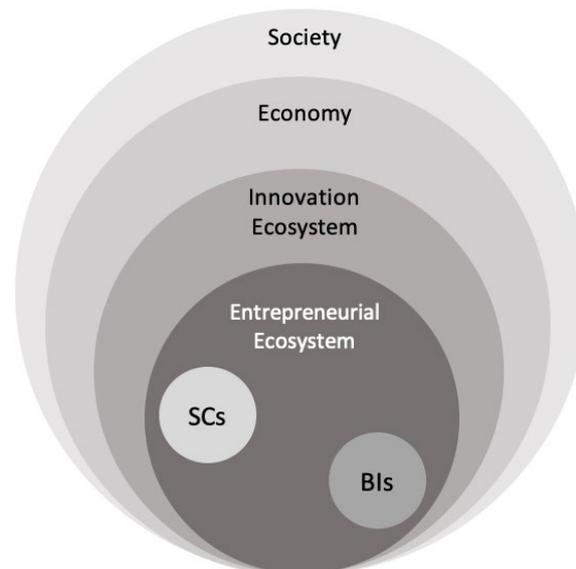


Figure 1. Start-up Communities (SCs) and Business Incubators (BIs) are Systems within Ecosystems.  
(Diadaptasi oleh penulis dari (Feld & Hathaway, 2020)

The interaction between actors and factors in the entrepreneurial ecosystem will also trigger the formation of a start-up community. Agents or actors in the entrepreneurial ecosystem can get support from several elements. Many actors will share the same intentions and action plans as establishing and growing a new organization that causes them to engage in similar behaviours and activities (e.g., seeking initial customers) and create a business-friendly community (Roundy et al. 2018). The community is an entity in the ecosystem that carries out some roles, both in developing human resources, strengthening technological aspects, etc. Based on the illustration, the position of the formal institutions of business incubators and the start-up community is depicted in Figure 1. The components in the ecosystem influence each other in complex relationships and ecosystems.

## 2.2 Characteristics of Start-up Communities

The beginning of a start-up community is generally an initiative of a group of people who have a shared vision to strengthen and share each other in developing entrepreneurship, primarily to gather support in growing their business. The start-up community often uses the term "ecosystem" to refer to the network of people, institutions, and resources needed to build a start-up. This ecosystem includes entrepreneurs of various backgrounds, skills, experience levels, private investors, public and private funding institutions, large companies that create

infrastructure, and universities (Cervantes & Nardi 2012). The purpose of establishing a start-up community, in general, is to support each other and share information and knowledge that supports the business development of each member. Community formation generally begins in an inclusive manner and without official institutions. Some stay like that even though they have grown to be significant. Some have institutionalized themselves as legally registered organizations. In general, not-for-profit oriented.

According to Feld & Hathaway (2020), the main actors in the start-up community are grouped into three categories: Leaders, Feeders, Instigators. Leaders are the main actors determining the growth of a start-up community. In general, communities that are growing well are led by entrepreneurs (Feld 2012). However, leadership in the community does not refer to the organizational structure but rather to the person's characteristics. Leadership in the community is not hierarchical. With its inclusive model, it's easy for new leaders to emerge organically. Apart from that, there are no hierarchies, no titles, and particular roles for Leaders. The Feeder is everyone in the start-up community, including governments, universities, investors, mentors, service providers, and large corporations. Instigators are non-entrepreneurs who still play a critical leadership role. At the same time, Feeder is everyone else in the community. Start-up community leaders set the pace and have a duty to make sure the door is open to everyone. Leaders and instigators should generally introduce newcomers to high-impact and accessible events. In addition to the form of organization that tends to be informal, the start-up community is also self-organizing.

Widespread Internet access and online social networks today encourage the expansion of entrepreneurial networks beyond the scope of networking in the real world or "face to face" (Yu & Perotti 2015). Today, start-up communities, especially high-tech ones, can grow anywhere, locally or virtually. They utilize social media and social networking platforms, making it easier for everyone to attend start-up events without physical distance restrictions. Social networking platforms also reduce the distance between entrepreneurs and investors, whether crowd funders, angel investors, or VCs. Networks built online affect the dynamics of the start-up ecosystem.

### **2.3 The Roles of the Start-Up Communities**

Formal networks, as generally built by universities, research institutes, and informal networks such as friendship and community relationships, are networking capital that contributes to productive entrepreneurship (Cohen 2006). The start-up community is part of the social capital in the entrepreneurial ecosystem. Forms of relational support such as building networks developing connections between entrepreneurs have a strategic meaning in increasing the efficiency and effectiveness of the entrepreneurial ecosystem, in addition to more traditional forms of transactional support such as tax incentives, grants, and others (Santos 2021).

The role of the start-up community in its contribution to the ecosystem is very diverse. The descriptions of the various roles of the start-up communities from several publications are described in the following literature reviews. The study of Mukul & Saini (2021) suggests that start-up companies, especially in small cities, with limited availability of talent inability to provide competitive salaries, tend to use their social capital to acquire suitable talent. Through social capital, they acquire talents based on familiarity or credible networks and recommendations. In the online community, fulfilling this talent need is easier to achieve.

The start-up community also acts as a source of mentors. Incubation management collaboration with alumni of entrepreneurs and the business world, such as consultation and mentoring, adds to the connectivity of social capital that may not have existed before (Bedó et al. 2020). The role of the community also seems to be a source of information and novelty for increasing the innovation capacity of start-ups. Multiple external knowledge sources enhance start-up innovation performance (Del Sarto et al. 2021). External knowledge-seeking in the innovation network positively affects a firm's incremental innovation capability (Shi et al. 2020). Knowledge generators can no longer be placed solely in research systems. Other actors such as user innovators, customers, new intermediaries, collaborative innovators, and citizen innovators make significant contributions, especially in newly recognized types of innovation such as low-tech and social innovation and classic products, processes, organizational and marketing innovations (Santos 2021).

The role of the community as a source of information regarding novelty in start-up development practices is unquestionable. An example is the circulation of information about the start-up innovation framework, which is now known to help the founding team develop their start-ups, such as Lean start-ups (Ries 2011) and Customer Development (Blank 2012) with its Build-Measure-Learn approach. These frameworks were initially developed among practitioners (Shepherd & Gruber 2021). Although the information is widespread throughout the entrepreneurial communities (Maurya 2012), its academic relevance and validity were initially met with skepticism among scholars. The start-up community is an "initial laboratory" that conducts various frameworks

and then transmits them to a broader audience, influencing the direction of entrepreneurship and research approaches in universities.

In many cases, the business validation process is primarily determined by the level of dynamism of the ecosystem. Ghezzi & Cavallo (2020) GC observes the digital start-up business development process with a Lean Start-up approach, which is strongly influenced by the level of dynamism in its environment. On many occasions, it was found that start-ups obtained early adopter discoveries through their community channels. The rapid development of innovation requires entrepreneurs to be more agile in responding to customer needs. The community also provides many opportunities to upgrade skills for its members. Some studies on the role of start-up communities in the entrepreneurial ecosystem are summarized in Table 1.

Tabel 1. The role of the start-up community according to various publication sources

Roles of Start-up Communities	Supportive Studies
Sources of talent	(Mukul & Saini 2021) (Feld & Hathaway 2020).
Source of mentors	(Bedő et al. 2020) (Feld & Hathaway 2020).
Sources of information (e.g., development of new technology/ framework)	(Del Sarto et al. 2021) (Shi et al. 2020) (Santos 2021) (Shepherd & Gruber 2021)
Partner of New Product and Business Validation	(Santos 2021)
Enrichment of Ideas, Opportunities, and Creativity	(Feld & Hathaway 2020).
Source of funding network	(Motoyama & Knowlton 2017)
Partner in business cooperation, market expansion, etc.	(Santos 2021)
Early Adopters	(Roundy et al. 2018).
New skills training	(Feld & Hathaway 2020).

The start-up community is social capital, an asset to the entrepreneurial ecosystem it supports. Social capital, or "network of trust," is rooted in relationships based on a set of norms and values that bind a group of individuals together and enable them to collaborate more effectively (Feld & Hathaway 2020). Feld & Hathaway (2020), the start-up community as social capital can reinforce the ecosystem in terms described in Table 2.

Tabel 2. The social capital of start-up community

Type of Capital	Description
Intellectual capital	ideas, information, technology, educational activities, stories
Human capital	talent, knowledge, skill, experience, diversity
Financial capital	revenue, debt, equity, or grant financing
Network capital	connectedness, relationships, bondedness
Cultural Capital	attitudes, mindset, behaviors, history, inclusiveness, love of place
Physical Capital	density, quality of place, fluidity, infrastructure
Institutional Capital	system of laws, functioning public sector, markets, stability

### 3. Research Agenda and Discussion

Forms of academic entrepreneurship include university research collaborations with industry, patent applications, consulting services, start-up/spin-off establishments, implementation of entrepreneurship education, and business incubator services (Secundo et al. 2020; Shane 2004; Wright et al. 2008). The practice of academic entrepreneurship is also classified as dynamic and complex (Wood 2011). Academic entrepreneurship is an extension of teaching and research activities, and on the other hand, it is the internal empowerment of universities in the capacity of technology transfer. The area around the university is essential in determining the success of UBI's role in generating start-ups and spin-offs. However, often universities have not opened themselves to the surrounding entrepreneurial ecosystem. In a developing environment, where there is already a solid entrepreneurial community, it can consider selecting the best projects and allocating resources. So that the region also acts as an incubator for start-up and spin-off companies that are born (Donegan 2019). The issue of network bond transformation needs to be considered to understand better the role of networks in developing new ventures (Rasmussen et al. 2015).

On the other hand, with a deliberate effort, a university may also offer programs that cater to nearby employers or choose to provide subjects conducive to entrepreneurial endeavours, such as entrepreneurship and technology programs (Bedő et al. 2020). Various things can stimulate the growth of the entrepreneurial ecosystem around universities. The ecosystem affects the business development process of a start-up. Therefore, the education and entrepreneurship ecosystems need to be designed to encourage university-industry-government collaboration in the commercialization of knowledge with engagement with the entrepreneurial communities (Belitski & Heron 2017).

Based on the initial studies, a system complexity theory is needed to understand the mutualistic interaction between UBIs and SCs conducive to increasing productivity in creating new companies. The start-up community is organized in a human relations network, categorized into groups and subgroups. According to (McKelvey 2004), science that focuses on creating order is better and more suitable for entrepreneurial science. Therefore, a dynamic and complex systems approach will be more appropriate to analyze the entrepreneurial ecosystem.

### 3.1 Conceptual Framework

The Viable Systems Model (VSM) is a framework developed by Stafford Beer to explain how organizations can continuously adapt to a changing environment by leveraging complexity and change management (Beer, 1984). The Viable Systems Model (VSM) provides a well-established framework to help diagnose and design organizations to survive and thrive in complex operating environments. As a conceptual model, VSM is built on the axioms, principles, and laws of a viable organization. The VSM approach also describes how a fully self-organizing system can develop with self-regulation and increase sustainability. Cybernetics is an interdisciplinary science that emerged in the middle of the 20th century. Norbert Wiener uses the term "cybernetics" as a science of control and communication, as stated in the subtitle of his book. He derived the term from the Greek word "Kubernetes," which means "steersman" (Beer 2002). The basic idea of driving is to take the best path in an ever-changing environment towards a predetermined destination (Lewis 1997). In Latin, "cybernetics" comes from the same root as the term "governor" used by Plato to refer to "governor" or "government". So, cybernetics can be said as science related to control in the context of system management or government (Perez Rios 2012). Pérez Ríos et al. (2012) stated that the Viable System Model (VSM) and Organization Cybernetic (OC) are both parts of Systems Thinking.

VSM is designed based on cybernetic principles. To achieve a viable system, VSM requires five subsystems within an organism or organization to maintain its identity independently, develop, and survive. (Beer, 1984). In addition to the composition of 5 subsystems, the VSM structure is equipped with six information channels, attenuators, and amplifiers to manage complexities in the operating environment. These features will be utilized in designing a conceptual model for the interaction model between UBI and SC. In this study, the system in focus is UBI and where SC is part of the operating environment.

The collaboration of UBIs and SCs should absorb the complexity of developing a new company by taking advantage of the existing modalities of both. Ashby, (1965) Ashby, (1965) was the first to convey the law of requisite variety "only variety destroy (absorb) variety" to explain this complexity. Proper management of the complex relationship between UBIs and SCs will strengthen the ecosystem. Based on these studies, the research framework exploring the role of the community to enhance the synergy with the Business Incubator is formulated in Figure 2.

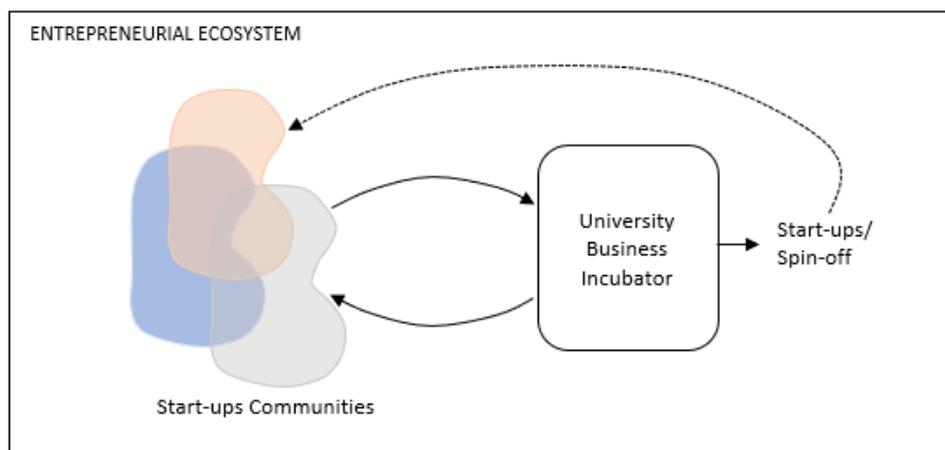


Figure 2. Research Framework for Mutualism Relationship between UBIs and SCs

Based on this principle, it can be understood that the operating environment (VE) variety (VE) is much more complex than the organizational variety (VO), and the organizational variety is much more complex than the management team (VM) variety. To maintain viability, a system (organization, company, etc.) must develop strategies to deal with the variety of environments in which the system operates. Based on OC's point of view, controlling the situation means managing that complexity. Regarding the management of this complexity, VSM approach to unravel the complexity is through an approach to the horizontal and vertical dimensions. The horizontal dimension approach is to unfold the complexity by attenuating the variety of the operating environment and amplifying the variety in the organization. Variety attenuation is done by selecting a variety from the operating environment, which is very large to be limited to the variety that is appropriate and relevant to the organization's needs to maintain its viability. The VSM capacity in designing attenuators and amplifiers is proposed to be the basis for a mutually beneficial interaction model between UBIs and SCs. An illustration of the basic model with its system components is depicted in Figure 3.

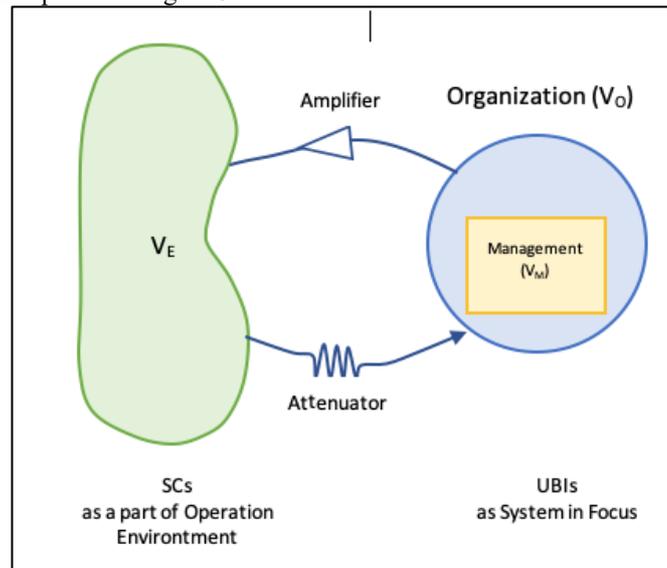


Figure 3. Basic Model with its Attenuator dan Amplifier Components

### 3.2 Scope

Based on the literature review that has been carried out, the research agenda regarding the mutualism interaction model of the two agents in this entrepreneurial ecosystem there is an opportunity to conduct related studies in various main aspects, namely:

#### a) Geographic and Culture Aspect

It can be understood that geographical features and characteristics greatly determine interaction and collaboration forms and provide a unique pattern in the ecosystem. In particular, this research is an overview of developing country ecosystems that are not conducive to the growth of technology-based start-ups. A review of several different cities will provide additional insights.

#### b) Regulation Aspect

University regulations and related local/national government regulations can be a driving force in this interaction model.

#### c) Leadership Aspect

The main actors in this mutualistic interaction consist of two parties, leaders in UBIs, including university leaders, and start-up community leaders. Leadership will be one of the keys to success. As confirmed by Roundy (2021), the role of leadership in UBIs is very decisive in developing the entrepreneurial ecosystem.

#### d) Programs

Specific programs and various activities can be developed to strengthen collaborations to foster interaction and further mature the ecosystem, making the ecosystem a rich place for the birth of start-up companies.

These aspects and others can be added according to conditions, which will affect the success rate of developing mutually beneficial interactions between UBIs and SCs and will build an entrepreneurial ecosystem.

### 3.3 Research Question and Methodology

To obtain such a sustainable model of mutualistic interactions and gain new insights into this interaction model in the entrepreneurial ecosystem, we need to answer some research questions. The main research questions identified are as follows.

RQ1: What are the local barriers and capitals in developing a mutualistic relationship between the start-up community and UBI in a developing ecosystem?

Models need to capture the peculiarities of problems in developing ecosystems, which may not be encountered in developed ecosystems. This particularity will be answered in the constraints and the local capital identified from data collection, diagnosis, and analysis.

RQ2: What are the key actors and factors that play a role in developing a start-up community in a developing ecosystem?

The actors and factors in question are related to the research aspects discussed at the beginning. Identifying stakeholders and diagnosis will provide a concept that complements the components in the design of the interaction model.

RQ3: How is the interaction model design between UBIs and SCs around the university conducive and supports the productivity of new companies in the ecosystem?

This mutualistic interaction model is oriented towards mutual growth in the ecosystem, sustainability, and increasing the productivity of start-ups.

Research methodology to answer the research questions is proposed using a qualitative approach, using a conceptual model design based on the Viable System Model and the Organization Cybernetic (OC) approach. Data collection will be semi-structured interviews with several start-up development actors in universities and related start-up communities activists to complete the conceptual model with a viable system model. The data collection process can meet research needs according to the following steps.

Step 1: Identify the stakeholders involved

Step 2: Diagnose the barriers and critical factors that determine the success of the interaction model

Step 3: Formulate a conceptual model

Step 4: Validate the model

As validation in qualitative research models, the implementation of focus group discussions and member checking can be considered.

#### 4. Conclusion

This study proposes a research framework and agenda to explore the mutualistic interaction model between UBIs and SCs. For universities where entrepreneurial universities have become a vision, and academic entrepreneurship activities are part of their business processes, this interaction model is intended to increase success in managing university start-ups/spin-offs. For SCs, this interaction model is intended to increase the ecosystem maturity, start-ups growth, and maintain the sustainability of the start-up community as part of an entrepreneurship ecosystem agent. Therefore, related research needs to be made on the agenda to support the entrepreneurial ecosystem development in universities and their surroundings. The research framework is proposed using a viable system model approach, which supports the decomposition of complexities in the entrepreneurial ecosystem. Thus, forming a synergy model will provide a reference for UBIs managers and startup community activists to determine the optimal pattern in developing entrepreneurial practices and increasing the maturity of a sustainable entrepreneurial ecosystem.

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