

ESTABLISHING UNIVERSITY VENTURE CAPITAL FUND: THE CASE OF HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Abstract

For entrepreneurs to be successful in any country, they need a favourable environment in which they can develop their ideas and grow their business. The concept of this environment, an ecosystem, is rooted in earlier developments around science parks and industrial district movements.

Within every entrepreneurial ecosystem much attention is focused on the role and health of its start-up component. Vietnam has experienced significant and rapid economic growth in the last twenty years; and, this shift has seen the country acknowledged as a leading nation for start-ups in Southeast Asia.

As a result, an increasing number of start-ups are being formed among university students, lecturers, and researchers, especially those in Science, Technology, Engineering & Maths (STEM) disciplines. However, one of the main obstacles most start-up projects is raising capital for deploying and commercializing scientific and technological R&D results. In many Western countries (e.g. USA, UK and the EU), University venture capital funds (UVCs) have been created in an attempt to overcome this barrier. In this paper we discuss how can one university in Vietnam - Hanoi University of Science and Technology (HUST) - establish an innovative start-up investment fund (the BK Fund). Theoretical and practical studies on setting up University venture capital funds will be necessary for HUST to overcome the legal barriers, financial resources difficulties and other constrains during the fund's establishment and implementation process.

Keywords: University venture capital fund, start-up, spinoff, HUST.

1. INTRODUCTION

We know that businesses – at any stage of their life - seldom operate in isolation and gain valuable knowledge from the local and regional economic area. When creativity and innovation have been placed at the center of entrepreneurship activity, the location where creating new technology ideas can be considered as the “nucleus” of the wider entrepreneurial ecosystem (Isenberg, 2010; Tung, 2018). Such an ecosystem can be defined as a community consisting of many self-governing actors (universities, governments, firms, investors, mentors, service providers) that can play a key role in the development of entrepreneurial activities for a given geographical area (Hechavarría & Ingram, 2018).

So, if we take the case of the European Union, at the heart of their enterprise policy is a desire to provide an environment that is conducive to business creation and

development, acknowledging the role of new firms in terms of job creation. As, van der Zwaan (2017) stated in his EU Report *Higher Education in 2040*: “tomorrow all universities will derive their right to exist primarily from being active *in* society and by producing knowledge *for* society;” in the light of this statement, a university therefore needs not only to manage its internal environment, but also to develop and manage relationships with various stakeholders coming from public and private sector (Etzkowitz, 2017). In 2020, Research England (RE) who are responsible for funding research and knowledge exchange at Higher Education Institutes invested in excess of £2,235M in support of enterprise-related activities to help the sector become a key partner in this process through a variety of initiatives (Culkin and Mallick, 2010). Such policies are underpinned by a (political) belief that increasing entrepreneurial activity is central to the UK’s drive for

international competitiveness and that the UK's world-class HE sector has a vital role to play in the development of entrepreneurial talent and opportunities.

In general, there are 2 models of entrepreneurship in a university setting formed from research results: start-up and spin-off. According to Salamzadeh and Kesim (2015), "start-up companies" are newly born companies, which struggle for existence. These entities are built mostly based on brilliant ideas and grow to succeed; formed to seek a repeatable and scalable business model. A start-up will find the solution for innovating, raising capital from angel investors, venture capital funds and having ambitions to eventually, go global. When a start-up finds a scalable business model, it ceases being referred to as a start-up (Blank, 2013). Start-ups are designed to go rapidly, make major changes or radical innovations, from which make impact to change the economy and the society, such as the cases of Microsoft, Apple, Google (Groenewegen & Langen, 2012). The notion of a start-up is associated with *uncertainty*, *breakthrough* and always contains *creativity*, especially in a university setting. The "creative" factor, on one hand promotes the viability of start-ups, but on the other hand, makes start-ups facing with financial risks.

A "spinoff" is the result of the creation of an independent company through the sale or distribution of new shares of an existing business or division of a parent company, it is sometimes referred to as a spinout¹. In universities, University spinoffs or Academic spinoffs mean "a special start-up company that is founded by an academic inventor with the aim to exploit technological knowledge that originated within a University setting in order to develop products or services" (Bigliardi, *et al.*, 2013). The difference between a "start-up" and a "spinoff" is that a spinoff is created by the University or a Research institution, with technology owned by the University, financed by the University and managed by the researchers or academics of the University. Whereas, when a start-up has to buy the technology license (technology transfer) from the University, as well as not has been funded and managed by the University.

In this paper, we use the term "start-up" for both university start-ups and spinoffs, as spinoff is just a "special start-up" upon the definition mentioned above. University start-ups can have one of the 6 conditions: patent base relationship, knowledge-based relationship, faculty engagement relationship, student relationship,

education-based relationship or incubation faculty relationship" (Hasegawa and Sugawara, 2017). The number of University start-ups is quite impressive if we look around in other countries; in the main, they have benefitted from regional or national government support. For example, in The University of Tokyo, at the end of 2015, it was 237 start-ups created with the market value of 10-13 billion US dollars and account for 0.2% total market capitalization of listed companies in Japan (Hasegawa, Sugawara, 2017). Likewise, Gregorio and Shane (2003) found that, more eminent universities have greater start-up activities than other universities. For example, Fred Emmons Terman at Stanford and Vannevar Bush at MIT, his PhD supervisor, created nuclei of technology commercialization in electrical engineering at these universities. During his time as, Dean of Engineering Terman provided some of the funds to help two of his former students, Hewlett and Packard, to form their firm in the late 1930s. According to Terman²:

"...through an unusual chain of circumstances, my laboratory received a \$1,000 gift ...[from]... the Sperry Gyroscope Company.....Packard would be ideal for this assignment in view of his experience at General Electric with vacuum tubes, so I asked Hewlett: 'Do you think Dave would be interested in taking a leave of absence from GE to work on this project for nine months or so? We could pay him about \$55 a month for nine months, and still have \$500 for expenses. He could take a leave of absence from GE ...and decide for himself whether you are right in feeling you have an adequate basis for starting a company.'"

In Vietnam, the first business incubators come in the university sector; it is not absolutely a prerequisite for starting successful company, but there are a number of factors that gave it, first mover status. Whether it originated from the university under the form of a spinoff or a start-up, it is impossible not to acknowledge the important role of the universities in promoting the establishment of start-up businesses. In many cities and provinces, start-up activities took place vigorously, promoting the entrepreneurial spirit of students in universities. Vietnamese universities organized workshops to connect students, lecturers with businesses, organized start-up competitions, introduce the entrepreneurship subject into the curriculum. A survey on start-up intention of students in Binh Duong

¹ When a company creates a new independent company by selling or distributing new shares of its existing business, this is called a spinoff. A spinoff is a type of divestiture. A company creates a spinoff expecting that it will be worth more as an independent entity. A spinoff

is also known as a spin out.
(<https://www.investopedia.com/terms/s/spinoff.asp>)

² https://smecc.org/hewlett-packard,_the_early_years.htm

province suggested that 91% students have a desire to start a business within which, 28% students had started a business, but got failure (Bien, Phu, 2018). Not only in Binh Duong, the reality highlight that failure of student start-up often come from one or more of a) a lack of knowledge and experience in starting a business; b) a lack of support from university and businesses; and, c) financial difficulties. With the survey on financial support for student start-up projects in Binh Duong, 37% of the students think that it is important to have interest support when they borrow money to start a business, 41% mention on the essential of providing diversify financial services and 38% state that it is necessary to have the support from the venture capital funds (Bien, Phu, 2018).

Funding for start-ups in Vietnamese universities comes from formal established funds or under the form of budgets dedicated to start-ups. Prior to 2016, funds to support start-ups in public universities were mainly through university-established incubators, where operating budgets came from the state budget and, capital raised from external investors for start-up projects. After 2016, on a national scale, the 2 Government projects: "Supporting the national innovative start-up ecosystem to 2025" (Decision No.844/QD-TTg on 18 May 2016) and "Support start-up students to 2025" (Decision No.1665/QD-TTg on 30 October 2017) were initiated with the twin aims of creating a, *synchronous* and *effective* start-up ecosystem, in which universities were recognized as an anchor institution (Culkin, 2016). These projects sought to establish a legal mechanism of fund building to support start-up activities in universities.

Although being considered the cradle for start-up activities, universities in Vietnam seem to have not fully played their roles; mainly focusing their attention on developing an entrepreneurial idea and the pre-seed phase. Some universities provide funding support for start-ups such as Vietnam National University, Foreign Trade University but they do not create their own fund. Recently, some universities have projected to set up a fund support for start-up activities, and some have established a fund support for start-ups such as Open University in Ho Chi Minh City. However, such amounts are quite low and only being an intermediary step for start-ups to become for attracting "next-step" external funds.

However, despite being one of the larger patent holders and utility solutions universities, HUST's technology transfer activities are still modest compared to the potential. In the past 10 years, although the number of patents and utility solutions of HUST has steadily increased over the years (in 2019, there were 18 patents been issued, double in compared to 2018), but the

income from scientific and technology services and technology transfers have reduced 1/3 compared to 2018 (An, 2020). Given the opportunity, HUST needs to a) develop a a more effective and efficient framework for technology transfer and, b) establish a start-up enabling system to make the most of the University venture capital fund (UVC). To support the launch of this highly innovative UVC in the last quarter of 2020, HUST has attracted the interest of media, researchers, investors, and businesses. Theoretical and practical studies on setting up University venture capital funds will be necessary for HUST to overcome the legal barriers, financial resources difficulties and other constrains during the fund's establishment and implementation process.

2. UNIVERSITY VENTURE CAPITAL FUNDS: AN OPPORTUNITY FOR STUDENTS' START-UPS

University licensing practices originated in the early 1920s when a group of scientists at the University of Wisconsin established the Wisconsin Alumni Research Foundation (WARF). Several of the first inventions patented and licensed by WARF achieved widespread public use and returned significant revenues to the foundation, enabling it to expand its activities (Atkinson, 1994). In 1974, Harvard Medical School entered into a twelve-year, \$40 million collaborative research agreement with the Monsanto Company for the purpose of developing new approaches to diagnosing and treating cancer. At the same period, Havard's technology-transfer group considered it-self to find alternative sources of development funds and routes to commercialization, including creating a venture capital fund, but all the discussions came to a halt in late of 1980, when the President of Havard at that moment chose another way of participated directly in a company (Genetics Institute). After that, since the passage of the Bayh-Dole Act in 1980, U.S. universities have increased their efforts in formal technology transfer and licensing, and in some cases, investments in new firms. Besides, many venture capitalists and investors still approached Havard Medical School and other researches universities for the possibilities of establishing a fund (Atkinson, 1994).

University venture capital funds then are recognized to begin in the 1980s the first time at Chicago University and at that period, only some universities have followed Chicago's experiment, most of US institutions still largely opt to work with traditional venture capitalists rather than create their own funds (Brown, 2017). The 3 cases of the medical schools at Havard, John Hopkins and the University of Texas has shown the development of university – affiliated venture funds which have

financed to the commercialization of university originated technologies in medical fields in the 90s decade (Atkinson, 1994). In 1990s, “academic capitalism” transformed academic institutions into entrepreneurial universities, embarked the universities with the new functions from TTO, science parks, incubator facilities to investing heavily in entrepreneurship education programs, entrepreneurship clubs, business angel syndicates and venture capital funds (Brown, 2016). The University venture funds then “began to flourish when it reached the British shores around the turn of the millennium” (Brown, 2017). The first University venture capital fund in UK was Imperial Innovations (later renamed as Touchstone Innovations) of Imperial College London. After that was UMIP Premier Fund of Manchester University in 2008, Cambridge Innovation Capital of Cambridge University in 2013, and then following with other universities. According to data extracted from Thomson One Database, until 2010, there were a very limited number of only 26 UVCs active (7 from UK universities, 2 from Swedish universities, 2 from Spanish universities, 4 from universities of Denmark, Belgium, Germany, Ireland, and the rest, 11 were from US universities). From 2010 until now, there are numbers of UVCs have been created, however, we can say that the US and the UK are the two countries that have the strongest University venture capital fund network. Thomson One uses the definition of “University-affiliated venture capital funds” to mention those University venture capital funds (Croce, Grilli, Murtinu, 2014). However, according to Quora.com, UVCs can be understood broadly as University-related venture capital funds, which are classified including University-backed venture capital funds (in US, for example the cases of NYU Innovation Venture Fund of New York city, BRV-BR Venture Fund of Cornell University, OSU Venture Fund of Oregon State University, Simon School Venture Capital Fund of University of Rochester...), University-affiliated venture capital funds (Berkeley Ventures of University of California, Experiment Fund of Harvard University, MentorTech Ventures of University of Pennsylvania...) and Student-run or Student-focused venture capital funds (University Venture Fund of University of Utah, Demming Center Venture Fund of Colorado University, or Social Venture Fund of University of Michigan...). In the vast world of technological transfer practices implemented by universities, the establishment and management of UVCs is nevertheless largely unknown and under-researched (Croce, Grilli, Murtinu, 2014). Unlike traditional venture capital funds, very few research papers refer to these UVCs. The two typical researches related to this topic are from Widding, Mathison, Madsen (2009) and from Croce, Grilli, Murtinu (2014) as just be mentioned.

Widding, Mathison, Madsen (2009) analyzed how UVCs finances to University Spin-Off companies based on lessons learnt from the UK, Belgium and the US. They concluded that UVCs can bridge the financing gap, especially as business angels with technological experience and background have been shown to be an important contributor of both capital and competence, but can only cover part of the capital required. UVC is not a likely source of funding for most of university spin-offs at early stage (cases of European universities, excluding biotechnology field). Venture capital becomes a vital source of funding when university spin-offs reach a stage that their growth potential matches the strict requirements of venture capital funds. Besides, Croce, Grilli, Murtinu (2014) based on the data of 26 UVCs in Europe and US extracted from Thomson One Database (VentureXpert) to make a quantitative research on UVCs’ performance. They found that, UVCs from EU seem to be more focused in financing the Start-up/ Early-stage than the US counterparts opposing the views of Widding, *et al.* (2009). UVCs from the EU focused on biotechnology and medical/health industry, while US UVCs are more focused on ICT and related industries. One of their key conclusions is that, the success of UVCs cannot be disjoined by the quality of the universities. Better universities are more likely to have successful UVCs, or at least attract funds. EU UVCs tend to invest in small enterprises (less than 50 employees), while US UVCs focused on larger concerns (more than 50 employees).

Although the concept of UVC is already very familiar in the world from almost 40 years, at the time of writing, no UVCs exist and no academic research paper mentioned about this type of funds in Vietnam. Some universities established Science and Technology Development Fund support for R&D projects, but it is not a venture capital fund financed for start-ups and spinoffs. However, in June 2020, one University in Vietnam, Hanoi University of Science and Technology (HUST), announced the intention to launch a University venture capital fund named BK Fund in late 2020. BK Fund has the expected capital of from 20 to 50 billions VND, operating under the model of a venture capital fund, managed by BK Holdings (Bach khoa Hanoi Technology Investment and Development One member company limited), the company which provides services of technology consultant and transfer, mobilizes and manages capital for incubators and commercialization of technology products from HUST. The University does not contribute capital in cash to the Fund but contributes by reputation and the right to use the University’s trademark, which equivalent to 15% of the Fund’s shares. This share limit will not change over the time and does not depend on the scale of the Fund. Each start-up in which the invention has commercialization potential

may receive an investment of 1 billion dongs as the primer capital (Nam, 2020). This idea of establishing a venture capital fund in one university is novel in Vietnam for university start-ups. However, difficulties remain in the establishment process before the fund is operating effectively, to bring the real benefits to university start-ups.

3. VENTURE CAPITAL PROCESS ISSUES FOR UNIVERSITY START-UPS: SOME SUGGESTIONS TO HUST

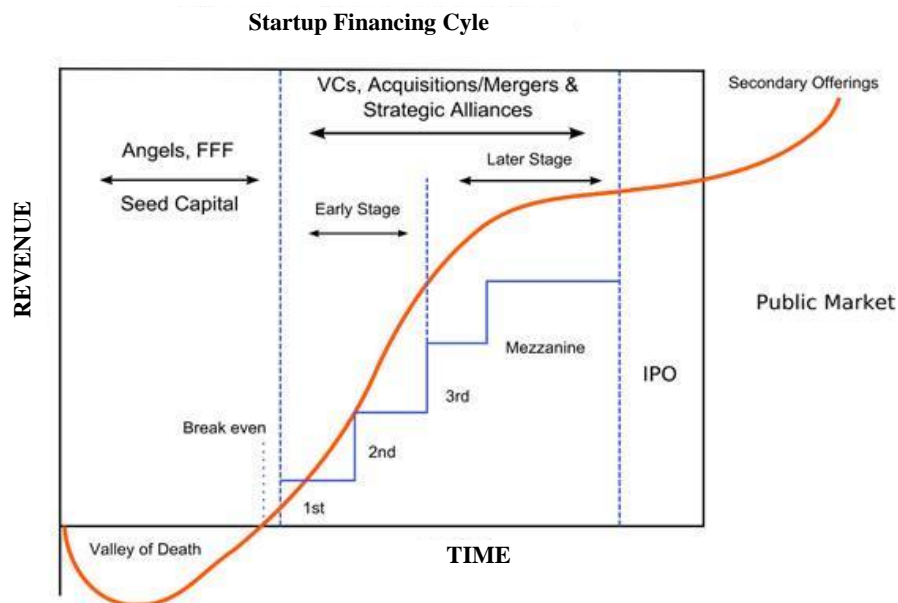
3.1. Legal, financial, and organizational issues

The Vietnamese venture capital sector has achieved a certain success; however, the current legal framework is still in its infancy (Giang, Toan, 2020). In the Law on Investment, Law on Enterprises, Law on Credit Institutions as well as Law on Securities do not acknowledge this kind of fund. Law on Supporting to SMEs No.04/2017/QH14 and its guidance Decree No.38/2018/ND-CP provide regulations relating to Innovative Start-up Investment Funds, but nothing about Venture capital funds. It means BK Fund has to operate under the title of an Innovative start-up investment fund;

and, follow Decree No.38/2018/ND-CP as no clear legal basis on venture capital fund exists in general and a UVC, in particular: the Decree on scientific and technology in universities is still in draft version, which may have some article(s) relating to Innovative start-up investment funds in Universities. Besides it, applying Decree No.38/2018/ND-CP, BK Fund can only have maximum 30 investors contributing to the fund's capital: the main obstacle to the operation and the capital raising ability of the fund.

In the process of product development and business model improvement, founders are always concerned with the question of project finance; hence, why the success in raising capital is also considered crucial for start-ups (Berger, Cowan, Frame, 2011)... Many entrepreneurs choose their own financial resources (often referred to as "boot-strapping") before seeking external resources, however the total mobilizations from the internal resources are quite limited. External resources from bank lending, 3F (family, friends, and fans), angel investors, venture capital funds, other start-up investment organizations (accelerators, incubators...) or crowd funding before IPO... are both good choices for entrepreneurs.

Graph 1: Start-up Financing Cycle



Source: <https://spiderum.com/>

In reality, STEM start-ups are almost built on intellectual property rather than physical assets, which characterized by high levels of creativity and high level of risk associated to their operations. Start-ups often spend a lot of capital raised in the first years of their life, while the mortgage assets are very low (Moro, 2020). This creates difficulties for both founders and investors

in evaluating the present value, as well as future expectations. As a result, start-ups are often unattractive to the traditional commercial banks; their capital financing often replaced by resources such as venture capital or capital from private investment funds. The reasons that venture capital funds prefers to invest in start-ups is not simply to enrich the investors, but also

because such investments are easy to monitor and founders cannot extract value for themselves. Many countries try to formalize the definition of “start-ups businesses”, allowing them to be prioritized for special grants and support from the government rather than traditional SMEs (Cavaliere, 2015), nevertheless as they have higher risks than traditional SMEs, while the government and other grant providers expect the safety, support from venture capital fund is really necessary.

Concerning capital raising ability, a traditional venture capital fund often receives capital contributed from its Parent Group (in the case of a Group/Corporation) or raising capital from commercial banks, investment funds, other financial institutions and from the market. Therefore, the venture capital funds belong to a big corporation have great financial potential and capacity to invest to start-ups. Those are the case of Vina Capital Ventures, FPT Ventures, CMC Innovation Funds, Vingroup Ventures... in Vietnam. Not only providing capital for the funds, these parent Group will also provide positive supports in terms of personnel with experienced professionals, and technical infrastructure. The Group also has a system of domestic and international institutional customers who can support to the project in connecting to find out customers' needs as well as bring products, services solution to the customers in a fastest way. Not only that, their partners can also be invited to join the investment or consult to the start-up. In the case of BK Fund, HUST of course can support to the fund through talent professors, academic staffs, institutional experts, and infrastructure. However, as informed to the media, HUST will not contribute capital in cash to the Fund, but contributes its brand name and the right to use the University's trademark, which equivalent to 15% of the Fund's shares. This is the typical characteristic of the investment of public university in Vietnam. According to Dung (2020), Vietnamese universities converge their mainly limited financial resources for their main task of training activities, thus, the investments in spinoff and start-ups are very little, almost nothing but value converted from its reputation or some facilities such as secondhand machines and equipments. These machines and equipments were mainly used for teaching and basic scientific research, which can be considered as processing workshops with low technology content, may not suitable for product development and completion, performing testing production and increasing commercialization capacity. This situation is quite different to UVCs in developed countries. Thus, with HUST, with an intention of raising capital from 20 to 50 billion dong for the Fund and the Fund can finance about 1 billion for each project, besides HUST staffs and external investors, HUST alumni is the potential and key investors. Until now, HUST have an alumni network of

200,000 alumni and among them, many people are in the important positions in big companies and they are willing to contribute, support for the development of the University.

However, as their contribution will come in the form of investments to University start-ups, and as venture capital investment contains many risks, they definitely want to gain confidence from the fund management company. BK Holdings is pointed by HUST to temporary manage the fund. With other case of UVCs in the world, TTO (Technology Transfer Office) is often be the agency managing UVCs (Croce, Grilli, Murtinu, 2014). HUST does not have a TTO but it announced to create a TTO in the coming time (An, 2020). However, the roles, responsibilities and tasks of BK TTO and BK Holdings need to be more clarified to avoid the overlap and ineffectiveness. BK Holdings was established in 2008. This is an enterprise with 100% capital of the University. BK Holdings now includes BK Holdings Education, BK Holdings Technology and BK Holdings Incubator. The Board of Members is appointed by the University. The operating apparatus is decided by the Board of Members or Board of Directors. They may be the staff working at the University or capable people from outside. BK Holdings establishment has made a new model of business within University which is different from other universities: (1) separating technology transfer activities and production and business activities from the public University administration; (2) to make the university's assets transparent in production and business process, create a mechanism for scientists in the university to contribute to the establishment of companies. Its aims are supporting research, incubation and commercialization. BK Holdings has created a close network with 25 training schools and research institutes within the university, including 150 research groups with 400 projects and 8 patents per year, forming a system of incubator and technology Hubs. However, this model gradually reveals its disadvantages over time, as the scientist who used to solving technical problems is not the right person having capability to run a business. BK Holdings then mainly focuses on training or providing consultings services to businesses, then the businesses have to process the technology transfer by themselves (An, 2020). Besides, although having 12 years experiences, having 9 member-companies and schools but in the market, not like other fund management companies, BK Holdings is still new in this area of venture capital management. In the private sector, reputation and management experience of the venture capital fund management company is among of the most important factors to attract capital investing to the fund. To be trusted by alumni – the potential investors, HUST must promote communication about BK Holdings, its

relationship with HUST, its experience in incubating and technology transferring, sharing its recent positive financial and operational results to alumni and other investors. Raising capital from investors of course is the most difficult issue in operating an UVC at the beginning.

3.2. Investment stage and University-based innovation and entrepreneurship ecosystem

The venture capital process consists of 3 steps: (1) fundraising; (2) evaluating, selecting and investing; (3) end of investment or divestment, selling shares or selling the enterprise to other investors (Trinh et al., 2014).

Start-ups often go through funding rounds: (1) Pre-seed (market testing or new field exploration); (2) Seed/start-up (business idea development, market suitability testing and development); (3) Early stage (optimization and model development); (4) Later stage (development and scaling); (4) IPO (Initial Public Offering). Individual investors, 3F, angel investors, crowdfunder often participate in the early stages (Pre-seed, Seed, Early stage) due to the small amount of capital required. Venture capital funds however often join the Seed/Start-up (Incubation/Seed/Inception), Early stage or Series A (Initial), Later Stage (Series B,C...). Join in the Seed/Start-up round, the amount invested by the Venture capital fund is not much, the risk is high and many investments are unsuccessful. But in some cases, it still benefits the Funds. The Early stage requires capital invested to develop the business model. The Growth round takes place when start-up have certain success in the market, so the capital requirements of venture capital funds are much higher, up to ten million US dollars to support for the size expand, market share increase, and create a new development level for the company. After this stage, the company usually reach a high value and can be re-purchased. That is the period of raising capital from commercial banks or stock market (IPO stage) as the fundraising ability become quite sure, rather than from the venture capital funds, which is a kind of risk investment. In their draft of Establishment Charter, BK Fund choose Seed and Early Stage are the stages for investing (traditional venture capital funds often invest from Early stage – graph 1, also the cases studied in literature review). However, many students of HUST come from the provinces and have very limited relationships, which make them difficult to raise capital from their relatives and friends, individual angel investors... for the Pre-seed stage, thus to make business ideas, scientific and technology products which are completed at a laboratory scale, results of accepted scientific research projects become seed groups, success in building business models and can attract more capital from venture capital funds to form businesses, supports from an incubator center is necessary. The role of HUST

in the start-up ecosystem did not really develop. BK Holdings Incubator has been established within BK Holdings. However, after 10 years, only 9 companies originated from HUST have been incubated. Compared to the capacity and potential of HUST, this is a very limited amount. Each year, HUST has about 400 research projects of HUST lecturers, researchers and students, but only few have been commercialized. Some spinoff companies did not choose BK Holdings Incubator as they do not get the information on the Incubator, means the communication of the Incubator is still weak, and the capacity of the Incubator is still limit. Besides the establishment of BK Fund, HUST has to think about creating Angel Investor Club. Business angels can be defined as high net worth individuals who invest their own money, either alone or with other, directly in unquoted businesses in which there is no family connection (Mason, Botelho and Harrison, 2016). In reality, with a business, several forms of support and investment in entrepreneurship can be carried out in gradually developing phases. For example, in the case of Hochiminh city, the city created the Angel Investor Club in the first phase, connected potential start-up projects with angel investors; and then formed a mechanism of consulting and managing start-up projects by establishing professional group to manage the connections and investment under the business consulting company model in the 2nd phase; and in the 3rd phase established a professional fund management company and created the venture capital fund. This project had been supported by the Ministry of Scientific and Technology, Embassies of Israel and Chile, and the angel investors at the beginning gathering leaders of many big companies (Thien Long, Dien Quang, Suntory Pepsico Vietnam, Viettel, E&Y, Casumina, An Phuoc, PNJ, GIBC). Such steps will bring more certainty to success because everything has been carefully prepared for the investors and businesses. Angel investor is different to Venture capital fund, as each investor is in smaller size with smaller investment amount, and often invest from pre-seed/seed stage (between the period of technology completion to the beginning of market entry (Binh, Toan, Khuyen, 2019). Venture capital fund will join after for promoting growth stage. Angel investors can decide on their investment themselves, while venture capital funds have to establish an Investment committee, to avoid the subjective opinion of one member, however, the fund management is implemented by a fund management company. Each angel investor may interest in one or few certain areas. They can commit to invest money to the good project they choose. With the case of an UVC, it is better to establish an Angel Investor Club to connect the alumni of the University and start funding to University start-ups before creating an UVC. According to Mason, Botelho and Harrison (2016), business angels can be

under the form of angel networks (formed as a network of friends or business associates which had been developed in 1980s and 1990s) or angel groups (a transformed model that really developed in recent decades when individual investors prefer to organise themselves into groups to invest collectively). These authors in their research also showed that, due to the differences between angel groups and venture capital funds on investment instruments, investment stages and investment objectives, angel groups can have opportunities (even quite few) to be the sequential investment complimentary investors for a start-up, beside venture capital funds (Mason, Botelho and Harrison, 2016). In case of BK Fund, as HUST has announced to the creation of BK Fund in late 2020, Angel Investor Club should be established in parallel to support for the earlier stage. Besides, the Incubation unit within BK Holdings also have to strengthen its capacity, improve services and communication. However if only relying on resources of the University, it is quite difficult for the Incubator unit for maintain and improve their activities. With the investment from Angel Investor Club and other resources (from University, Ministries or City), Incubation Center could incubate a scientific and technology product or project from the laboratory scope become expanding to industrial scale in reality. Angel investors through their club will contribute every year for financing to incubation activities and they also spend time for advising the start-up project they choose to invest. University can support via the office, incubation center's staff, provide some free services for projects, support in applying for funding from ministries and organisations. This will also help to create an university-based innovation and entrepreneurship ecosystem.

Regarding the allocation of capital for each stage of investment, each fund has their own strategy and principles. For example, with IDG Ventures, the fund will invest to the start-up following the 3 stages: (1) Seed/start-up: the fund grants 40% of the total committed investment capital for the project to enable the company to develop its products and promote marketing activities; (2) Early stage: 40% of the total committed investment capital to produce and launch products into the market; (3) Growth period: spend 20% remaining for investing in production expanding, market scope extension, upgrade products and optimize the production structure. This capital allocation rate is quite reasonable, that can be a good example for BK Fund to consider. The representative of the Venture capital fund will then represent the investors to participate in the Board of Director of the start-up company for monitoring the management and implementation of the capital invested.

In reality, if the investments by venture capital fund are well managed, it can bring a high rate of profit to the

investors. For example, IDG Ventures Vietnam has an increase of 30-40% per year. The average time of the start-up investors around the world (from the time the start-up company gets access to the capital until when the investor divests the fund to invest in another start-up) is about 3-5 years, and HUST also expect an investment period of 4 to 5 years for each project funded by BK Fund, but in reality in Vietnam, it took from 7 to 10 years. That means, both the University and the alumni who invest in the start-up projects have to determine that it is a long-term investment, with high risk but high profit if well-managed, and they have to spend money and effort to make the investment become effective.

At the end of the venture capital investment process, the fund should have strategy to divest capital and distribute profits. This period often occurs when the start-up business has reach a mature stage, after the completion of product development, marketing implementation, and before the stage of production scale expansion, revenue and profitability in a good and stable level, with a much higher share price compared to the initial time, and the company is going to go IPO in the market), the venture capital fund will divest the capital, collect profits and continue investing to other start-up. The method implemented can be shares transfered to other investors and withdraw from the company, or the company will buy back the shares from the investors, or transfer the rights and obligations to the third party and receive the corresponding payment.

However, it is necessary to specify the divestment time expected from the beginning of the investment between investors and start-ups, so that the companies will not be suprised, unpredictable and can not actively in doing business. Sudden divestments can lead to risks for start-ups, for example financial risks can happen when the capital has not been fully disbursed, or when start-up can not afford to buy back the shares, or in case of information risks when the start-up has shared too much information and plans with the investors. Besides it, in the future, to increase the rate of divestment through the stock exchange, open more opportunities for UVC and other investors, the information relating to the start-up which has been funded by UVC need to be public more. Actually this ratio is currently very modest (Trinh et al., 2014) because start-up companies are SMEs private enterprises, not be listed and unbound by information disclosure.

3.3. Investment selection issues

Related to investment choice, to select project or start-up that receive the investment, among numerous start-ups currently, the venture capital funds often prioritize the selection of small and medium size start-ups, with creative ideas, good plans, having potential for development and opportunities in the market. The

Fund's investment committee works together to make a decision, in avoiding subjective opinion from one member regarding the investment project (Binh, Toan, Khuyen, 2019). Characteristic of founders and managers of the start-up can be one of the choosing criteria. As in the case of DFJ Vina Capital, they intend to give their choice to the Vietnamese founders (wherever they stay), products serve to the Vietnamese consumers, and project using Vietnamese human resources. While Vina Capital Ventures defines one of their criterias is the project which can make a positive impact to the economy of Vietnam and to the technology development. Start-ups in university are less in quantity, however, BK Fund still has to set up a criteria framework for choosing projects to invest. With a university as HUST, founders of the start-up can be students or academic staffs or anyone outside of the university. Students and academic staffs must be both in priority in the selection process, but it should be more prioritize for tech-students, who are the young talents, with high qualification, quick adaptability, having great love with technology and high ambitions, as the purpose of the venture capital is not to develop high technology, but to nurture and develop potential young businesses (Trinh et al., 2014).

Good people and good ideas are just part of the reason for selection. In reality, venture capital funds often invest in good industries. The trend of investment choice of Venture capital funds in recent years focused on the following areas: (1) technology companies (fintech, hi-tech in agriculture, medical technology, educational technology); (2) model of chain development, as Vietnam is weak in this area (Phuong, 2019). The establishment of BK Fund aims to target the 1st groups. Until now, HUST students and academic staffs have had many high quality research projects in Information and technology, electronic and telecommunication, electricity, mechatronics, dynamic mechanics, bio-medical, chemistry, physics. It is clear that due to the development trend of the digital economy and the 4th Industrial Revolution worldwide, the new and hightech segments is still the first choice of venture capital funds (CMC Innovation Fund, Convergence Ventures, IDG Ventures, Cyber Agent Ventures, DFJ Vina Capital, FPT Ventures...), and it is no exception with UVCs like BK Fund. Thus, BK Fund should focus on the projects that applying technology platforms such as AI, big data, IoT, blockchain..., but can not ignore projects in other strength areas of the University such as material science, automation engineering, biomedical electronics... We know that, beside the financial support, the fund can also provide mentors for the project, and alumni of HUST are those who have many experience years in the production and business, having knowledge in both technology and the market to support as mentors, of course in their field of interest or operation. For example, Chairman of

Austdoor group pointed out that some inventions of HUST relating to water-proof and dust-free glass which have potential to develop into commercial products can be invested by his group. In financing to the fields they need and choose, they can also be the mentor for advising to the start-up. Or the chairman of the Board of Directors of Rang Dong company intended to contribute 5-7% profit after tax to contribute to BK Fund if there is a digital transformation project and he is ready to apply to his company (HUST Conference on UVC establishment, 2020). However, in the start-up investment process, there is always the problem of asymmetric information (Nosfinger, Wang, 2011). That's why in the market, there are many innovative start-ups nowadays, but not all businesses are funded by venture capital. On the side of venture capitalists, they are at high risk due to asymmetric information, they do not have or have very few information related to the performance of the company and obliged to self-analyse the company's performance in order to make an investment decision (Larh, Mina, 2016). As such, it is important that start-ups should have strategy and knowledge, and share information about their business ideas, plan implementation and potential market to attract investors. If the start-up only has ideas, lack of knowledge, experience and planning, it will be very difficult to raise capital. And then the cooperation and sharing of information during the implementation of the start-up project so that the investors can get the most suitable and optimal support for the start-up.

On the other hand, after signing the investment agreement, the venture capital fund has to provide strategic advice, support and join the management, administration, professional support, deployment and network expansion. In reality, the venture capital funds often have a lot of experience and capacity in many areas related to business/company operations, from legal, financial, to human resources, technology, communications, marketing... For the case of BK Fund, eventhough it is managed by BK Holdings-a company of HUST which having 12 years of experiences, this model of a venture capital fund within an university is still very new, beside the support from investors, the consultation from external experts and other venture capital funds are certainly necessary.

4. CONCLUSIONS AND SUGGESTIONS

The development of a start-up ecosystem including the State, investors, enterprises and universities with the participation of students, lecturers and researchers will be a method of comprehensive development, and the university should play the pioneering role. In the past two decades, the field of academic entrepreneurship has found greater visibility, and universities are now recognised as a source of creativity among high-tech

firms. Universities are moving from their traditional roles of research, teaching, and knowledge dissemination to a more advanced role in society, creating spin-offs and promoting academic entrepreneurship. In Vietnamese context, entrepreneurs of start-ups need the infrastructure, finance, coaches and mentors, and universities can be used as catalyst in this national innovation ecosystem model (Rowan, 2019). However, the current situation of Vietnamese entrepreneurship is unsustainable with 90% of start-ups stop working in the first 3 years primarily this is due to self-destruction rather than competition (Dung, 2020). In respect of university start-ups, such limitations relate to poor legal frameworks, organization models, a lack of entrepreneurship knowledge among students, lecturers and the university, a lack of information and (the correct) mechanisms for coordination between businesses and universities and capital raising for start-up projects are the main issues. The establishment of funds supporting to start-up activities including the new model of UVC will be inevitable and necessary. However, with UVCs like BK Fund, fundraising will be more difficult than the private equity funds, as they primarily raising capital from successful alumni and contribution in-kind from the university.

In order to mobilize more financial resources for the fund, HUST must design a clear strategy and roadmap for establishing and developing a start-up support system within the university. This will start with the creation of the Angel Investor Club, in parallel with launch of the BK Fund, in order to increase the capacity of raising capital from potential investors and better support start-up projects from the early stage. The BK Holdings Incubator has to take the role a professional incubator centre to promote a high level of service quality, such as promotion of training activities, organizing workshops, connections with the market, the development of consultancy services, increased investment on innovation labs for product commercialization of university start-ups. On the other side, if BK-Holdings is confirmed to be chosen as the management company of BK Fund, it is important to enhance the capacity of this company in managing venture capital fund, which is totally a new task for this company, as well as promote the communication to attract both internal and external investors. Improvements in the personnel quantity and quality, as BK-Holdings currently has staffs who are very good in technology, but they need more experts who have good experience in finance, investment, and business operation. The criteria for investment choosing, the rate of University's capital ownership in the start-up company, the rate of profit sharing with investors have

to be clearly defined to attract more investors, as they are those who mainly contribute financial resources and mentoring services which can lead to the success of the start-up projects. The clarification of tasks and responsibilities of BK-Holdings and BK TTO is also necessary. Non-financial activities for supporting university start-up such as organize start-up competitions, strengthen the cooperation between university and businesses, and enhance the intention and knowledge on entrepreneurship in the university, learning experiences of success start-ups are also important. Actually, not all the universities in Vietnam have to invest and set up a full start-up supporting system, but it is important to take advantages of the unique superiority of each university and enhance the collaboration between universities. As such, universities can fulfil their mission of being the center for entrepreneurship and innovation.

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