



Research Article

The Impact of Technology-Based Incubators in Creating a Sustainable and Scalable Startup Culture in Emerging Economies: A System Thinking Model

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Abstract

University incubators are becoming a key stakeholder in creating a startup culture in different societies around the world, both developed and developing. The entrepreneurship ecosystem is built around a variety of stakeholders; however, the role of human capital remains invaluable. The passion, technology-savvy growing generation around the world, the campus environment and the blended academic-business-industry setting are all contributing factors to create a flow of innovative ideas that could be taken to the next level through the commercialization of products and services. In the context of emerging economies, this paper addresses the notion of university-based incubators and their role with a country-wide entrepreneurship and innovation ecosystem in the context of Egypt that although going through a series of challenges since 2011, it still possesses a wide spectrum of opportunities and prospects given its youthful society. The Venture-Lab (V-Lab) experience is a platform that was created not only for the students of the school of business at the American University in Cairo (AUC) where it is hosted, but for the society at large with innovative ideas that have the potential to realize a sustainable and scalable impact on creating a competitive and agile small and medium sized space that could have long-term implications on productivity, job creation and economic development.

Keywords: Incubators, entrepreneurship, innovation, startup, scale-up, sustainability, systems dynamics, Egypt.

Introduction

The development of an entrepreneurial culture should follow a bottom-up approach that spreads across the community and becomes embedded in the way people think, plan, work, study, and go about doing different things in business and society. The stakeholders in the entrepreneurial ecosystem are many and diverse; each plays an important role in developing, institutionalizing and promoting entrepreneurship and innovation. One of the growing and invaluable key stakeholders in the ecosystem that provides the rich and much needed body of knowledge associated with the academic setup that supports entrepreneurs is the university-based incubator (UBI). The concept of campus incubators is growing in number, impact and role when it comes to the entrepreneurial ecosystem in the society. Generally, campus incubators are widely perceived as platforms providing a nurturing environment for new business ventures and business startups that stem from ideas generated and developed by university undergraduate and graduate students (Kamel, 2013a). To support such growing community, some universities, in addition to developing an incubator, either open offices for supporting entrepreneurship and/or establish technology tracking offices that are focused on promoting innovation and helping startups especially those that are technology-based. Some identify the university incubators as the equivalent of a career office where the ultimate outcome for entrepreneurs is a gateway to the marketplace with all the support, opportunities, mentorship, funding possible and more (Kamel, 2014). Incubators could be the gateway to the marketplace with the right idea and a value proposition to the society.

Entrepreneurial universities in general are increasingly becoming essential agents in generating knowledge and innovation while capitalizing on emerging information and communication technologies (ICTs). Such mandate serves their purpose as

academic institutions focused on research and education but also supports their quest to fortify their invaluable role in knowledge creation, dissemination and transfer as well as the commercialization of innovative ideas especially through technology-based ventures and startups creation (Kitagawa and Robertson, 2012). Universities could be teaching and researching entrepreneurship versus being entrepreneurial themselves in anything they do. The latter are those who really have an impact on creating the entrepreneurial culture in the society (Kamel, 2014). It is not just about teaching entrepreneurship in the classroom, but it is all about the case studies, extracurricular activities, the teaching method, the interaction with industry and business and the blending of course content and the amalgamation between theory and practice. It is the mindset and the culture that need to be created and embedded in campus life (Kamel, 2012).

The importance of having UBIs is invaluable for the formulation of a vision and a strategy for the promotion of innovative research in technology-based startups, which is becoming increasingly important in today's global competitive economies, and more important for emerging economies that are looking for a platform to make a difference and realize socioeconomic development (Scaramuzzi, 2002). Unlike stand-alone business incubators who are mainly providing a classical environment for new business startups with the incubation, funding and mentorship required; the ones that are located within university campuses play an important role in developing solid and effective relationships between the academic establishment and different businesses and industries across the society (Kamel, 2013b). UBIs are intended to link ICTs, resources and human capital to entrepreneurial talent for the objective of accelerating the development of startups and consequently accelerating the commercialization of technology. Respectively, multiple universities around the world started establishing their incubators, providing insights for policy

makers and aspiring entrepreneurs into the various facility design, management policy, and value-added aspects of this emerging tool employed by some entrepreneurial universities as a strategy for supporting the development of new startups and helping economies at large (Kamel, 2014).

The access to university facilities; faculty, staff, mentors, library resources, and students support through the model of the entrepreneurial clinic is where free advice and counseling is provided on campus 24/7 and where some of those clinics are buzzing with students and mentors representing some of the many advantages UBIs offer (Robertson and Kitagawa, 2011). The growing interest and passion for UBIs stems from the significant potential of the interdisciplinary nature of the environment that could be created either from the academic disciplines offered on campus including business, engineering, chemistry, biotechnology, art, and more, and the diverse groups of stakeholders off campus involved and engaged within the ecosystem (Kamel, 2013a). In addition, the research outcome that could result from assessing the incubated startups becomes increasingly important for businesses, industries and entrepreneurs across different sectors in today's competitive and changing global marketplace (Manimala and Vijay, 2012). The learning environment on campus provides the proper setup for the creation of the entrepreneurial culture among the youth; the future leaders and entrepreneurs; the ultimate agents of change.

As early as the 1980s, more than 50 universities in the United States had business and technology UBIs established. Since then, the concept has spread worldwide across different regions with a growing number of universities finding UBIs as an integral element of the educational experience to leverage their research, teaching and service outcome. Moreover, the partnership between universities, industries and businesses represent another effective platform that can contribute to socioeconomic development, productivity and growth

(Kamel, 2013b). Campus incubators are a great fit to the learning process, they relate theory and practice and can effectively turn the interested students not only to become knowledgeable in entrepreneurship but also to become entrepreneurial themselves (Mian and Oswego, 1996). UBIs encourage innovative new businesses, help disseminate knowledge, which schools specialize in, and complement the teaching of entrepreneurship in the classroom in closing the gap between academia and the business world. With small and medium-sized enterprises (SMEs) growing in number and impact in driving different economies; either developed or emerging, universities can stimulate the economy by supporting the proliferation of startups (Scaramuzzi, 2002). This is the way to create an entrepreneurial mindset that can help create the required culture for a startup nation, one that can have a positive impact with respect to job and wealth creation (Kamel, 2012).

In general, UBIs are perceived as an important venue for research through theoretical inquiry and access to faculty and different facilities as well as help foster university-industry and business entrepreneurial linkages and partnerships to support the development and growth of the startups incubated (Mian and Oswego, 1996). Across different universities the model differs. Experience clearly indicates that no one size fits all. Some have accelerators that are profit-oriented, others develop their own incubators or labs that are purpose-oriented, and some establish their own centers or institutes (Robertson and Kitagawa, 2011). However, the one thing that all universities are focused on is to leverage their entrepreneurial education with hands-on experience that can provide their students and different stakeholders with the platform to apply theory into practice. Mostly, the ultimate strategic objective is to create a societal impact on the economy and the betterment of the society (Manimala and Vijay, 2012).

Entrepreneurship and Innovation in Egypt

In this pivotal time for Egypt and the Middle East region, the notion of startups, a strong entrepreneurial culture, and an innovative mindset is now more than ever needed to become the driver and catalyst to rebuild Egypt and the region on strong, solid and sustainable foundations. Entrepreneurship is not new to Egypt nor to the Middle East. Egyptians throughout history have been known as successful entrepreneurs across different sectors; this includes trading, agro-business and the textile industry to name a few, moving between provinces in Egypt and across nations in the region being actively involved in establishing and growing businesses in different sectors; something that had somehow changed some time ago where the aspiration of many Egyptians has been to work for the government and the public sector. The motive was to secure a job with minimal risk and daily challenges. It became a culture that relied primarily on securing a safe working opportunity regardless of the potentials that presented themselves elsewhere in the marketplace (Rizk and Kamel, 2013). However, this has gradually started to change since the late 1990s with a growing young population that is technology savvy, better educated, more exposed and willing to venture into the business world at a younger age. In 2008, such change started to take better shape with the proliferation of business associations, organizations and business plan competitions supported by investors, mentors, local companies and multinationals (Kamel, 2014).

Consequently, over the last 6 years, more than 140 organizations in the Middle East were established and/or started to provide different types of support whether financial or non-financial to the entrepreneurial ecosystem. There were several factors that contributed to such change including, but not limited to, an average population growth rate of 2.1% per annum in Egypt of its 85 million people that is overwhelmingly young with 58% under the age of 25 coupled with a growing belief that the nation's future can only be

improved with a more agile and competitive private sector (Kamel, 2011). Moreover, the change was enticed by the growing diffusion of ICT usage and an increasing investment in entrepreneurial awareness campaigns and educational and training programs. Accordingly, over the last decade many stories emerged in the Middle East of promising entrepreneurs who have great ideas for startups that can have positive implications on the societies of the region. Given the demographics of the Middle East and with a growing and young population increasingly exposed through various technology and social media platforms, there is no shortage of ideas that can spawn startups in different sectors and industries such as health, environment, tourism, education, agriculture, energy, recycling, music, entertainment and more.

According to the Egypt Entrepreneurship Report 2010 by the Global Entrepreneurship Monitor, The Total Entrepreneurial Activity (TEA) rate which measures the percentage of the population (18-64 years old) either actively trying to start a business or already owning and managing a business was 7 percent in 2010; ranked 37 among the 59 TEA-measured countries (Hattab, 2010). The majority of the young entrepreneurs who chose to pursue entrepreneurship indicated they had done so due to a lack of better employment opportunities. This low entrepreneurial activity took place at a time of high economic growth when Egypt's gross domestic product (GDP) in 2008 witnessed a growth rate of 7.2 percent, primarily driven by the private sector, which generated 68 percent of the total growth (El Dahshan et al, 2010). Consequently, having low entrepreneurial activity indicators at times of high economic growth indicates that most of the growth was driven by 'older' companies, rather than new startups.

In response to the low rate of entrepreneurial activity, the government of Egypt established several strategies to encourage entrepreneurship. They included training programs, financing opportunities, and technical support

(Hattab, 2010). Rules and regulations have also seen some shifts. Regarding the ease of doing business, Egypt was considered one of the top global reformers when it came to simplification of administrative work in 2007 (OECD, 2009). For example, the creation of “one-stop-shops” to consolidate government services in one location have helped streamline and facilitate the process of starting up a new business (IBRD, 2012). However, most of these reforms have targeted large investors and corporations, rather than small startup companies. Moreover, given the developments of the last few years, there were a number of steps that need to be taken and most recently a new investment law is about to be announced and should go into effect in the second quarter of 2015.

The government has also supported entrepreneurship (albeit mostly SMEs, rather than high growth innovative entrepreneurship) through financial opportunities. For example, public banks such as the National Bank of Egypt, Banque du Caire, Banque Misr, and the Bank of Alexandria have created departments to address the particular needs of SMEs (AFDB, 2009). Moreover, the Social Fund for Development and the Industrial Modernization Center, both quasi-governmental entities, have created SME support programs (AFDB, 2009). Looking at the entrepreneurial ecosystem holistically, El Dahshan, Tolba, and Badreldin (2010) identified some of the most active organizations in Egypt that support entrepreneurship. These organizations included the Information Technology Industry Development Agency, the Middle East Council for Small Business and Entrepreneurship, Nahdet El-Mahroussa, Ashoka, Entrepreneurs Business Forum, Endeavor, Alashanek ya Baladi, the Egyptian Junior Business Association, The American University in Cairo, the Center for Entrepreneurship at Cairo University, and the European Training Foundation. However, this is a dynamic space that needs to be monitored on a regular basis given its dynamic nature and the continuous changes that take place and the players that come on board or leave the ecosystem.

Building a University-Based Entrepreneurial Ecosystem

Within the context of emerging economies, UBIs are gradually growing in numbers to cater for the needs of their societies especially those with demographics that are dominantly young and that are interested in establishing a solid, diverse and competitive private sector. In the case of Egypt, with 58% of the population under the age of 25, entrepreneurship and the investment in human capital for the creation of a competitive private sector is key. There is a youth population that is interested in creating a startup culture that could transform the society (Kamel, 2014).

Therefore, in 2013, The American University in Cairo (AUC) organized the soft launch of the first full-fledged UBI in Egypt; the Venture Lab (V-Lab) aiming to translate technologies and innovations developed by different selected startups across the country into commercially viable ventures. The V-Lab is managed by the Entrepreneurship and Innovation Program (EIP) of AUC school of business that was established in 2010 as part of the school 2010-2015 strategy aimed at promoting and supporting a growing entrepreneurial culture in Egypt. The strategy was focused on helping to create an entrepreneurial culture supported by three distinct pillars; innovation, leadership and responsible business (Ismail and Kamel, 2013). EIP that was transformed in 2014 into the Center for Entrepreneurship and Innovation (CEI) identifies and avails mentors, as well as incubates, connects and supports talented youth and facilitates their success beyond AUC, into Egypt and the Middle East and North Africa (MENA) region. The V-Lab capitalizes on the resources and reach of the university at large and its state-of-the-art campus facilities in terms of human, knowledge and technology infrastructure (Ismail and Kamel, 2013).

At the early stages of building the EIP ecosystem, discussions and meetings were held with various stakeholders sharing a common entrepreneurial passion. These

conversations included faculty, students, alumni, and business leaders with specific interest in the area. To formalize these discussions, the school established the Entrepreneurship and Innovation Council to act as an advisory body, which had among its members faculty and business leaders with interest in entrepreneurship. Over time, they became judges and mentors in competitions, acted as angel investors, and provided advice in designing the various EIP programs and activities. EIP also established a network of practitioners, business executives and academics interested in mentoring and

coaching entrepreneurs at various stages of their startup journeys (Ismail and Kamel, 2013).

EIP takes a comprehensive ecosystem approach in designing its action framework, focusing its activities on six key areas: entrepreneurs, ideas, networks, mentors, funding, and startup ventures. The program focuses heavily on partnerships with other organizations associated with entrepreneurship to implement its activities. Table 1 demonstrates the primary focus areas of the framework.

Table 1: EIP Primary Focus Areas

Focus Area	Description
Entrepreneurs	This area is implemented by raising awareness about entrepreneurship among different participants. They vary in education, demographics, socioeconomic backgrounds and age groups. This stage acts as a catalyst for startup team formation and exposes the entrepreneurs to the venture process and the entrepreneurial ecosystem.
Ideas	This area revolves around generating attractive ideas, conceptualizing business opportunities, and developing business plans; all responding to market needs in Egypt. Leadership panels, partnerships with incubators, and summer camps represent the major activities of this area.
Network Creation	This area reflects the collaboration of 28 universities, companies and international institutions and the involvement of business executives from a variety of sectors where participants are exposed to real-life examples of entrepreneurship. Meetings and discussions are carried out between like-minded entrepreneurs, industry experts, and local leaders.
Mentorship	The area revolves around coaching and mentoring potential entrepreneurs through the development of their business plans and launch of their startups. Furthermore, mentors provide internships in startups. The mentoring process is done through the university mentors' network, and supported by faculty advice, workshops, and training.
Startup Ventures	This area takes place when entrepreneurs are encouraged to seek funds. They are connected to venture capitalists, angel investors, and potential investment partners. EIP also offers financial awards through startup competitions. Consequently, some entrepreneurs are admitted to business incubators and others are assisted in promoting their ideas to the market. This is done by connecting startups to incubators and accelerators, supporting incubated startups in partner organizations, or providing visibility and access to startups.

Working with young entrepreneurs highlighted the need for providing additional in-depth services to serious early-stage entrepreneurs/startups as they worked through their business modeling and planning, fundraising, and setting up their operations and partnerships. These services are best provided to a smaller number of startups through an acceleration/incubation program. This provided the motivation to expand the scope of the entrepreneurship ecosystem at AUC by establishing the AUC V-Lab as indicated before.

Over the last four years, EIP activities supported more than 5,000 entrepreneurs from several provinces in Egypt including Cairo, Giza, Mansoura, Alexandria and Aswan as well as from other countries in MENA such as Lebanon and the United Arab Emirates. Since its inception, EIP had positioned itself in the entrepreneurship ecosystem as the educational partner becoming the primary platform for knowledge sharing and dissemination in the space of entrepreneurship and innovation and collaborating with the different main stakeholders in the ecosystem including Injaz Egypt, Flat6Labs, Endeavor Egypt, ENACTUS and others.

As indicated before, AUC V-Lab, as a university-based incubator was established to provide in-depth support services for a small number of serious entrepreneurs and their startups. The findings from a background research conducted on startups in Egypt demonstrated that there is a huge “white space” in the market (Ismail and Abdallah, 2013). Many startups were in need of services that could be easily offered by a university-based incubator, such as mentorship and coaching, networking and connections, and access to university facilities, faculty and students. The business model of the V-Lab was based on research conducted to study other university-based incubators in the world (Ismail and Abdallah, 2013). This provided insights into the various business models of university-based incubators, which helped shape the V-Lab business model. Globally, for example, universities

tended to select companies that matched their own internal competencies. Many indicated a significant interest in technology, and the time period between affiliation and incubation ranged from several months to several years. Many also offered multiple incubator types and stages, allowing a diversity of entrepreneurs to enter their programs. Compared to the United States, emerging market programs tended to offer longer incubation periods (up to 18 months), and university faculty also tended to demonstrate a more intimate, one-on-one relationship with the incubated entrepreneurs. It was also found that short-term incubators were a double-edged sword; on the one hand, they may push entrepreneurs to get their products to market more quickly, but they may also rush products that need more time to develop (Ismail and Shabana, 2013).

AUC V-Lab runs in addition to all the above mentioned EIP activities and programs and offers a few serious entrepreneurs a variety of services aimed at assisting the startup process, increasing business survival rates, and providing avenues for access to funding from angel investors, venture capitalists, or other sources. The V-Lab utilizes the university's capabilities (knowledge, faculty, staff, facilities, space, brand name, and services) to help companies with strong growth potential launch successfully. AUC V-Lab offers workspace, facilities including the library, as well as engineering, multimedia, and technical labs, funding, business skills training, seminars, business plan competitions, networking events, mentorship, coaching, and assistance through professional services such as human resources, recruitment, communication, marketing, and legal assistance. In addition to the access to faculty members, students and facilities of the university but also unique to the V-Lab is the access to students for product testing, class projects and internships. Moreover, the V-Lab organizes two regular events; a weekly event where the university community is invited to meet the startups, give feedback on the product

or service as well as a bi-weekly event where mentors are invited to share experiences, both successes and failures with the entrepreneurs of the startups incubated.

The V-Lab provides incubated startups with the following services:

- *Workspace*: is available in the V-Lab where startups are granted access to a shared co-working space on campus during the acceleration cycle. After that time, some may be granted an extension based on need and performance.
- *Training*: a week-long boot camp (training program) is offered at the beginning of the incubation cycle, covering the fundamentals of management as well as specific topics of interest for startups, such as fundraising and idea-pitching.
- *Mentoring and coaching*: startups are supported through a mentoring program that provides access to advisors and coaches in their respective industries and sectors, based on need.
- *Access to investors*: during the incubation period, the V-Lab organizes networking events with investors and connects incubated companies with potential investors.
- *Other services*: other services, which are offered as needed, include access to students for employment and/or market research, access to faculty as mentors and/or consultants, assistance with professional services such as human resources and recruitment, communication, legal assistance, and access to other AUC facilities upon request and agreement, including AUC engineering and technical labs.

To date, multiple rounds were completed with over 23 startups incubated since the inception of the V-Lab. Initially, over 500 applicants were presented but only the short-listed startups were handed around 3,000 US dollars each, in return for zero equity. The incubation cycle is designed to last for eight months. The initial cycle

included 6 startups from diverse sectors with products ranging from wearable gadgets to mobile applications. The V-Lab funds itself through sponsors and school budget. UBIs are usually sponsored by different businesses and industries. In the case of the V-Lab, SODIC, one of the leading real estate development companies in Egypt, and the Arab African International Bank (AAIB) are the primary sponsors. It is important to have earmarked sponsors to provide a sustainable financial support to the startups in their initial phase. The V-Lab enables the entrepreneurs of the incubated startups to capitalize on AUC's world-class facilities, knowledge base, connecting them to the university's alumni network and supports fostering a thriving ecosystem of innovation, education and business.

The V-Lab provides a space for young, passionate and promising Egyptian entrepreneurs to develop innovative business ideas and solutions to some of the most pressing problems in the community. They are not supposed to be primarily AUC students since the model from the start was developed to serve Egypt's young and promising entrepreneurs regardless where they are coming from. In that context, AUC is determined to provide the mentorship and support network that will give these talented young people an opportunity to make their dreams a reality.

The V-Lab Experience to Date

UBIs are established to empower entrepreneurs and foster innovation in an attempt to contribute to socioeconomic development through the creation of jobs and if the proposed ideas can be translated into successful products and services, the economy will be in a much better shape (Scaramuzzi, 2002). Innovation and entrepreneurship can be a key driver for competitiveness of the economy and for accelerating inclusive economic growth. In that sense, this is exactly what the V-Lab was established to realize with an additional mission to support in filling the existing gaps in the emerging entrepreneurial ecosystem in Egypt. One of the primary strategic objectives is to

capitalize on AUC's intellectual capital and world-class resources, select a few high-potential innovative startups and help transform these teams into scalable startups.

Through the early incubation cycles, there was a number of promising startups incubated including Mubser; the technology-based startup providing cutting-edge technology for the visually impaired around the world through a wearable gadget that can be integrated into a smartphone or through the device' customized pocket computer. With the help of algorithms, it can detect the obstacles in front of the user and notify him/her through a vibration bracelet in the user's hand and/or through a Bluetooth headset in the user's ear. It is important to note that in 2013, Mubser won first place in the ICT track at the Idea to Product competition held in Brazil. Other startups incubated at the V-Lab covered ideas related to media and news; edutainment, transportation logistics, and textiles. A number of the V-Lab incubated startups and their founders have been recognized by different international awards including candidates among the 30 most promising young entrepreneurs in Africa by Forbes.

While UBIs are popping everywhere, AUC's program seems to be the first incubator in the region to be supporting entrepreneurs across the community. While some are limited to specific technologies, others only serve their own students. The V-Lab prides itself on being open to entrepreneurs from across Egypt. With several different models on which to base the V-Lab operations, the key here is finding a strategy that is right for Egypt. A strategy that can help bring the different stakeholders in the ecosystem together and help realize a scalable and sustainable impact.

The V-Lab has adopted best practices from global university and private incubators alike, but the team is forging ahead with their own adapted and localized model; one that can help optimally realize the strategic objectives it was initially created for. The longer incubation option,

welcoming applications from across the country, and two startup competitions a year are all elements that AUC school of business has chosen in order to maximize its ability to support job creation in Egypt. The model is gradually being iterated with continuous efforts to constantly improve the management and governance structure. To assess the success of the V-Lab, the university has developed a number of key performance indicators (KPIs). The main indicator of success is the number of startups that the V-Lab creates in addition to the number of entrepreneurs trained through the V-Lab learning program, the number of startups incubated and supported by services offered and the volume of startups able to access funding (and the amount of funding) as a result of the V-Lab incubation.

In 2013, a new Swedish organization was established to provide international ranking for university-based incubators and to help establish standards and best practices for their operations. UBI Index (<http://ubiindex.com/services>) provides benchmarking and best practice sharing services to university-based incubators, as well as advice to corporations and government on how to best support these programs. In 2014, AUC V-Lab was selected among the five most promising university incubators in Africa, based on the first round of incubation. As V-Lab grows its programs, it is learning from the benchmarking exercise and also joining an international network of peers.

It is important to note that UBIs are increasingly becoming the ultimate resource-base and the convenient environment conducive for the development of successful technology-based startups and hence promoting technology-based entrepreneurship. However, there are issues that remain to be of primary importance for continuous research and they relate to different entrepreneurial elements in the equation and that is the individual, the process, the organization and the environment. The experience of the V-Lab resulted in a number of accumulated experiences that could be summarized in the following: (a)

the importance of using partnership models when collaborating with different stakeholders in the ecosystem including the venture capital funds, the angel investor networks, and the providers of training and professional development including non-profit organizations are a critical success factor; (b) the importance of building on the resources and facilities on campus including utilizing available services across the university such as faculty, labs, research centers and students and focusing on areas where the startups could benefit from being incubated within a university is invaluable. For example, the first two startups incubated at the V-Lab were created by AUC professors and alumni; both were based on innovations in science and engineering in the areas of biotechnology and solar energy. In each case, the startup was working with AUC students to improve their business plan, implement marketing research, conduct additional technical research, and connect with AUC network of funders and mentors. Through this integration with the university, these startups benefited tremendously and contributed to both university and students. This relationship makes a university-based incubator distinctive from any off-campus incubator; (c) the use of an iterative experimental approach in growing the scope of activities starting by creating awareness within campus on entrepreneurship, among faculty, students and alumni followed by an expansion in creating partnerships with key actors in the ecosystem and in the number of activities followed by moving to the phase of building the UBI then creating a vehicle to fund the startups incubated. Such approach provides the ability to experiment and learn, to build a stronger network with key stakeholders and to invest the resources efficiently; (d) the creation of locally engaged stakeholders helps build a solid support base and lay a foundation for long-term sustainability. Individuals and institutions who are engaged in the process whether they are from within or outside the university tend to have greater interest (Ismail and Kamel, 2013). These stakeholders become strong long-term supporters of the UBI and that is invaluable for a scalable and sustainable

impact on the entrepreneurial ecosystem coupled with the invaluable role that entrepreneurs play in advancing a country's economy (AFDB, 2009) which in many ways' points to the important role of universities in fostering and promoting an ecosystem for innovation and entrepreneurship (Wilson, 2008).

The V-Lab Workflow

The V-Lab targets startups after the idea stage and prior to entering the market. This phase fits well with the university-based incubator model, as at this point, entrepreneurs have a general idea of what their product or service will look like and a prototype or pilot, but still requires a significant amount of technical and business support. Startups entering the program must have or be working on a prototype, pilot, or proof of concept for their product or service. The V-Lab is sector-agnostic but requires that entrepreneurs have an innovative approach to solving or filling existing demand with a unique value proposition. Through its partners, the V-Lab has reached out to students in all 17 public universities in Egypt to ensure a diverse and interesting pool of applicants. Startups go through a rigid two-month selection process that includes a detailed application, initial presentations, and finally the pitching of ideas to a panel of seasoned entrepreneurs and investors. The selection criteria cover three main areas: first, the business opportunity or idea must be original, has an impact on a problem, fill a market gap, be innovative, and fit with the V-Lab service offerings; second, the business must have passed the idea stage and have developed a prototype, and the viability of its revenue model and cash burning rate will be examined; third, the entrepreneur must have commitment to the business, managerial capabilities and an acceptance of feedback.

The selection process is designed to add value to the entrepreneurs, even if they are not selected for incubation. Before the final presentations on demo day, all companies are required to attend an interactive training program that focuses

on building business skills. This also enables the V-Lab to work closely with each entrepreneur and evaluate his or her talents, abilities, and motivation. The program is designed and led by AUC faculty, business practitioners and executives selected from our mentors' network.












Based on the selection process, startups are admitted into a four-month acceleration program. During this period, the V-Lab educates startups on basic business skills, works with them to finalize business models and develop functioning prototypes of products or services, and connects them to business leaders and mentors. A "startup boot camp" training program explores basics business principles, as coaching and mentorship is offered in tandem. Facilities including labs, theaters, and mass communications are offered, as well as workspaces. Entrepreneurs are offered help in recruiting other students, especially interns, to join their projects. The acceleration phase provides training to students in five areas of business management. First, they are taught the basics of planning a business, including the business model, market, product, and value proposition. They are introduced to project planning tools and taught how to create a business plan. The second aspect involves developing a "product that works." Next, launching that product requires skills in marketing, advertising, and sales. Financial management explores aspects such as equity management, financing, budget and cash flow management, as well as accounting and

taxes. Finally, training on "organizing for growth" helps startups learn how to manage people, as well as organizational values/culture, in an early-stage organization. Upon finishing the four-month cycle, startups are expected to have a finalized business plan, a working product or prototype, and a financial plan.

The coaching program supports the team on areas that do not require deep expertise, but general management experience. Coaches are selected based on expressed interest, as well as matching during events (for example, speed mentoring). Each startup is assigned one coach, who is requested to meet frequently. Coaches are generally individuals with relevant work experience and a deep interest in the company's idea/business model. They also should have the capability to pitch and/or defend the idea in front of investors. Speaking and networking events are also held on a regular basis. These are open to outside entrepreneurs, and include pitches, speed mentoring, sharing of success stories, and relevant topic-based speeches. In addition, AUC V-Lab assists with fundraising by providing access to an angel network and support in negotiating deals. Promising startups may be offered an additional 9-month "incubation" period. This primarily involves customized support for the startup, such as workspace, use of facilities, and guidance. Entrepreneurs may be advised on human resources and legal support and participate in 3-9-month mentorship programs. Table 2 lists the startups that were incubated since the establishment of the V-Lab.

Table 2: Profile of AUC Venture Lab Startups

Startup	Description
	D-Kimia is the first biotech spinoff from AUC Labs. Based on knowledge, research and technologies developed at AUC, D-Kimia develops novel and affordable diagnostic solutions to detect a broad range of diseases, initially focusing on the identification of the hepatitis C virus.
	DoubleVee stands for verification and validation. The first Egyptian company to be specialized in software testing, DoubleVee performs functional, performance, operational and security testing services according to international best practices and standards.
	Tatweer is a social business whose mission is to upgrade and develop under-utilized trade channels, starting with the street kiosk.
	Madad is an online platform that provides a directory of sustainable development projects in Egypt. The platform offers potential donors a gateway to financially support appealing projects, track the use of their donations, and follow the execution of the projects.
	STEBN is combining the convenience and flexibility of a bicycle with the accessibility of public transportation. STEBN is a network of stations made up of fleet of bicycles located throughout the city. Drag a bicycle by using the smart card to take a trip, then return it to any station located in the city.
	Top Choice Admissions is a holistic admission consulting firm by graduates of MIT, UC Berkeley and LSE to assist students with all aspects of the university application process from standardized test prep to admissions essays.
	Jozour is working on producing wood panels from date palm midribs through innovative and unique machines. We design and manufacture our own machines. We also develop different types of wood boards to be supplied to furniture manufacturers and interior designers.
	En2ly is a web and mobile service connecting Egypt's fragmented freight transportation industry. In Egypt, individuals own 90 percent of an estimated 1 million freight trucks. It's estimated that half of these trucks are routinely under-utilized, and often carry no shipments when returning from a delivery destination, wasting fuel and contributing to environmental decay.
	Mubser develops wearable tech to aid visually impaired people in their everyday lives. Mubser's pilot product, Sensify, coordinates the user's smart phone or Mubser pocket computer to detect obstacles and notify the user through vibrations on a bracelet and a Bluetooth headset.
	Bus Pooling is a subscription-based bus service that transports commuters between home and work. After submitting a request, Bus Pooling matches individuals living in the same area, who share the same work location and hours, and supplies a bus and schedule customized to meet these needs.
	Creative Bits applications provide snowball technology to help people create electronic applications and provides an E-robot kit to teach children programming, electronics and to make their own toys.

	<p>Waffar.ly is a portal for sustainable and resource efficient solutions and products for your home and office, providing access to expert and peer knowledge on sustainable practices and efficient technologies. On demand, we also conduct on-site audits to support the customer to identify sources of inefficiencies.</p>
	<p>Tumbleweed is the first Egyptian social-travel guide application that gives users the ability to explore and follow experienced users and activities of their interest. It is a platform “Hub” where Egyptians can share their personal travel experiences, join communities, try new activities and places that they never knew was available in Egypt and at the same time contribute to the service providers by flourishing the domestic tourism.</p>
	<p>Ion-7 is an indie games development studio that is specialized in making AAA mid/hard core games for mobile devices, iOS and specifically Android.</p>
	<p>Gymawy is an Egyptianized personal trainer application on your smartphone. It provides trainings, diet, and hints that you need in your day in order to reach your healthy life style target. The uniqueness of our application is driven by localized content for Egypt that is otherwise unavailable on other fitness mobile applications on the app store.</p>
	<p>Soutak.com is an online platform that enables any person to engage with their in-office elected representatives and candidates of any elections (parliament, syndicate, sport clubs, student unions) in a way that is easy, social and enjoyable.</p>
	<p>Shireet is digital music entertainment network/Label that targets underground musicians. Our focus is managing the digital rights of unsigned talents. Shireet capitalizes on the team’s founding members’ expertise to produce high quality videos at cost for underground artists. In exchange, the artists sign up with shireet to manage his digital presence.</p>
	<p>Axology deals with the “science of accessories.” A product innovation firm, it designs and builds accessories to optimize security and efficiency in cargo handling.</p>
	<p>Alkottab is an “edutainment” games studio. AlKottab believes that games are not just for entertainment but can promote important educational values and change perceptions of how to approach and solve problems.</p>
	<p>Kashef Labs is developing a ground-penetrating radar capable of detecting the many landmines left by the Axis forces in WWII on Egypt’s borderlands. Using an unmanned aerial surveillance tool that is lightweight and utilizes minimal power, the radar flies 1 meter above desert rock and sand to scan the ground.</p>
	<p>El Shahbander helps textile workers inside Egypt communicate with one another, introducing them to manufacturers and importers through a website and mobile application. El Shahbander is the first specialized community in the Egyptian textile industry, bringing global trends to the local market.</p>
	<p>Smart News is a multi-platform content application that provides localized news organized by country, category and interest. Users can select the source of their news, as well as the fields, which include national and international coverage, sports, fashion, and technology.</p>

Initiating a Startup Surviving Sustainability Systems Thinking Model

AUC entrepreneurial ecosystem is driven by a mission to promote entrepreneurship and innovation universally across Egypt and to help in realizing socioeconomic development and growth. Therefore, although the goal of university-based incubators varies between (a) facilitating the startup of new companies, increasing their survival rate and growth and, more generally, by training entrepreneurs, and (b) stimulating firms involved in emerging technologies or the commercialization (or transfer) of research done in universities, research institutions and firms, still there was no clear indication for its role in business sustainability. Figure 1 demonstrates a proposed startup surviving sustainability (3S) systems thinking model to explain the dynamics of the entrepreneurial life cycle starting from the

idea stage all the way to business growth and sustainability.

The role of EIP in the 3S model spreads across its different stages but it primarily focuses on the surviving stage. During this stage, entrepreneurs are running their businesses on their own. They should recognize the importance of building up their carrying capacity or the reserve that in long term will be used as the boosting mechanism for resource adequacy, which is the engine to increase the likelihood for entrepreneurs to survive but more importantly grow, sustain and scale-up. The 3S model shows that in case of failure to feedback the resource adequacy by any external or internal reserve such as ICT deployment and/or human capital, startups will be affected by negative implications due to lack of adequate recourses, and that will result in slowing down the business which will eventually lead to business collapse and failure.

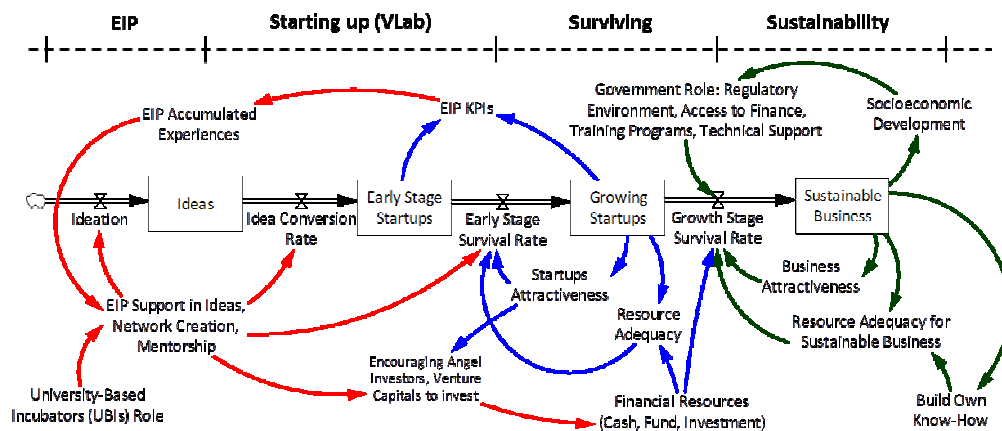


Fig.1: The 3S Model for Entrepreneur Business Growth and Sustainability

Conclusions and Lessons Learnt

Based on interviews with the EIP and V-Lab teams, program beneficiaries and entrepreneurs, four key lessons learned were identified. First, it is very important to use a partnership model to collaborate with other players in the ecosystem. This ensures that synergies are established with

outsiders while strengthening the ecosystem. Second, it is critical to build on the assets and strengths of AUC as a university in designing the program and incubator. For example, there is a need to focus on areas where there is interaction between the incubated startups, outside students, and faculty. In addition, there is a need to link startups with AUC facilities,

labs, and services. Third, it is advisable to use an experimental/gradual approach, for example, starting with a small number of startups and focusing on their growth. Finally, the creation of local stakeholders within and outside the university is an important factor for the success of the program. Partnerships form a base of supporters and stakeholders who care about the program and seek its success, which is critical in overcoming many of the challenges and risks associated with operating in emerging markets.

The V-Lab has developed a number of key performance indicators (KPIs) to measure its performance and impact. The main KPI is the number of successful startups the V-Lab will create; however, additional indicators include the number of entrepreneurs trained, the number of startup ventures incubated and supported by the V-Lab services, and the percentage of startups that access funding (and the amount of that funding) as a result of being incubated. Mentors' ability to link entrepreneurs with business executives and entrepreneurs, as well as the creation of partnerships between startups, business, government, and educational institutions, are additional indicators of success. Despite the importance of the role of UBIs in initiating new ventures and the importance of their partial role in surviving the startups, nevertheless entrepreneurs must learn how, not only to survive but also to sustain and to scale up on his/her own.

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