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The University of Maryland's VentureAccelerator

1. Introduction

In the 21st Century, universities will play a central role in the health of the US “innovation economy”. According to a recent National Science Foundation report, in 2004 science and engineering expenditures at universities and colleges amounted to almost \$43B, with \$27B from the federal government, \$2B from industry and the remaining \$14B from state and local government, institutional and other sources.¹ This funding provides an exceptional foundation for new scientific discovery, as well as for the advancement of applied technologies.

Unfortunately, a relatively small percentage of these new discoveries ever translate into long-term commercial successes. Several impediments, both institutional and market-driven, conspire to keep inventions from finding their way into, or better yet becoming the foundation of, commercial ventures. Examples of institutional impediments include: (a) lack of market acceptance for university licensing practices, (b) conflict of interest concerns for faculty, particularly within public universities, (c) lack of alignment between publication of findings and application for patent protection, and (d) weak or nonexistent entrepreneurship culture and education for science and engineering faculty and students. Common market impediments include: (a) limited initial seed-stage funding for the development and improvement of prototypes, (b) the difficulty of creating functioning early-stage management teams and (c) the mismatch between talents required for commercialization and a university's traditional career rewards.

Two other factors hamper technology venturing on campus. First, most US universities do not have reliable venture-building expertise at the seed-stage level. Venture-building expertise includes access to funding and team-building networks, as well as experience in planning and launching ventures. Second, most regions suffer from inadequate hands-on, seed capital resources willing to invest early in the life of a new technical venture. These voids in a region's venturing ecosystem discourage many technologists within universities, and other institutions, from embarking upon the commercialization of innovations.

Given these impediments, to achieve their most effective role in the innovation economy, research universities require new, more aggressive models of commercialization. Traditional models of Intellectual Property (IP) licensing are insufficient alone to unlock the untapped commercial opportunities stemming from scientific and technical discoveries on campus.

One of the most promising paths forward is the creation of formal programs that empower students and faculty to take an active role in commercializing their inventions through new company formation. Such a program requires more than information and education; it requires direct, hands-on assistance with most facets of business formation, planning, networking, financing and team building. United States colleges and universities have a tremendous untapped entrepreneurial resource in their students and faculty.

Recently, the University of Maryland's Clark School of Engineering, through its VentureAccelerator Program, has pioneered the provision of specific and dedicated services for

faculty and students that make discoveries with commercial merit. The explicit goal of VentureAccelerator (VA) is to encourage technologists in a university environment to found new enterprises through the availability of intense, direct assistance with the process. VA exists, therefore, for the expressed purpose of “commercialization through venture creation” rather than licensing.

Below, we outline the philosophy behind the program, discuss its mechanics, provide examples of actual new company formations and their results to date and share some of the lessons learned from the initial years of the program.

2. Organizing Principles

First and foremost, VA is founded on the belief that certain high-value discoveries are best commercialized not through licensing of IP to existing entities, but rather through the formation and advancement of new, purpose-built ventures. This principle derives from the fact that larger organizations that license technology often do so with an agenda that competes with a new technology’s raw potential. A new company, on the other hand, formed with the expressed purpose of exploiting the commercial opportunities of a new technology is free from other goals that may conflict with direct and rapid advancement.

This belief is bolstered by evidence that University spin-outs (companies founded by university employees) receiving venture capital funding have a higher success rate than their non-spin-out counterparts.² This higher success rate stems from the competitive edge that technological advantages give new companies, as well as the high opportunity costs university founders must overcome before making the decision to found companies.

A corollary to this philosophical principle is the practical fact that, over the last decade, private company investments in internal R&D have declined steadily as a percentage of annual revenues. The drive to create quarterly success in corporate American markets often leads managers and investors to view exploratory R&D as a ‘drag on earnings’. As such, companies have turned their attention away from having indigenous discoveries and toward a process of promoting and benefiting from “open innovation” – a process that spends resources on scouting the marketplace for new technologies that have proven their application to new markets and pursuing them for acquisition.

Next, VA follows the principle of risk mitigation. VA relies on the fact that most new businesses that succeed, regardless of market or business model, do so not by luck, (although “luck”, often in the form of “timing”, can ultimately play a large role in success), but by focusing on reducing the risks from known sources of early failure. VA, therefore, is designed not to “find success”, but rather to “mitigate the risk of failure” from the most obvious sources of new venture collapse.

Through its research, MTECH determined that the five most common reasons for start-up technology business failure that can be addressed with process are: (a) poor or incomplete business planning, (b) lack of understanding of customers and/or marketplace, (c) misalignment of limited resources and goals (failure to prioritize), (d) unbalanced skills, primarily resulting

from incomplete management teams, and (e) under-capitalization. VA services, therefore, are designed specifically to address these five areas of concern. The Table below illustrates the types of services offered by VA and the area of risk they are designed to address.

Venture Accelerator: Areas of Assistance

	Business Planning	Customer & Market	Goals & Priorities	Skills and Teaming	Access to Capital
Plan Development	■				
Financial Modeling	■				
Market Validation		■			
Marketing Assistance		■			
Best Practice/Priorities			■		
Service Providers				■	
Recruiting Help				■	
Grant ID & Advice					■
Intro to Angels/VCs					■
Temp Office Space					■

Next, VA relies on the fact that University spin-off companies, when supported, can generate superior economic rewards for participants. Most university inventions are at least two stages before the traditional venture capital investment stage. Transforming the invention into a commercial new product or service takes significant guidance over as many as four years and requires an average of \$4 million in pre-VC investment. If fostered through this period, however, university spin-offs are 108 times more likely to go public than the average start-up.³

Finally, VA leverages the principle of Social Capital. Social capital is often defined simply as the advantage created by a person's location in a structure of relationships. In *The Forms of Capital*⁴, Pierre Bourdieu more formally defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition." Because Universities occupy a unique, respected and often privileged position in local, regional and national business ecosystems, they have inherent opportunity to leverage and activate the "aggregate possessions" of myriad organizations and individuals on behalf of its causes.

VA is organized to focus, in a formal way, the aggregate possessions of its constituents behind the future success of newly formed companies based on campus discoveries and their inventors. While not an economic investor in companies, the program is designed to mirror the social structure and behavior of private sector Venture Capital funds in their processes, procedures and network capabilities and to invest the University's "social capital" on behalf of selected projects.

In summary, VA is designed to encourage and assist with the formation of new, purpose-built companies around technological discovery and to then invest the social capital of the University on behalf of these select newly formed companies to mitigate their risk of failure in the delicate early years. To make this system work, VA has built a process that takes substantial care in the selection of technologies and faculty and student participants that receive this benefit. The program then provides an intense amount of assistance in the early days of company operation as detailed in the following sections.

3. The VentureAccelerator Process

Two of the most important items in getting the VA Program started in a way that could lead to success were: (a) developing a set of rigorous processes in alignment with University policies and procedures and commercial business practices and (b) selecting a person to lead the program who has experience in technology start-ups and experience in, or at least knowledge of, investment and venture capital processes.

The VA process is carried out in six steps: (1) rigorous selection, (2) streamlined licensing and contracting processes, (3) best-practices formation and set-up, (4) planning and modeling, (5) plan testing and execution, and (6) graduation Phase. These steps are discussed below.

3.1 Step 1- Rigorous Selection

The VA process begins with rigorous selection of candidate companies and faculty or student participants. The first screening begins passively with the information provided on the program's website. VA took great care to craft a website that clearly communicates the mission, goals and services of the program. One of the most important achievements of the Program was the publication of its clear and strict criteria for the acceptance of VA client companies. A simple review of these criteria as published on the website is sufficient to spark interest or dissuade less serious candidates. The criteria, in brief, are as follows:

- Coach-able founders realistic about the company's management needs and the economic and governance implications of team-building and financing;
- Sustainable differentiation rooted in intellectual property;
- Total addressable market in excess of \$500 million in annual consumption;
- Defined customer needs that match the proposed innovation;
- High likelihood a scalable business, characterized by recurring revenues, margin expansion, and downstream exit opportunities, can be created; and
- Synergy with the VentureAccelerator Program.

The complete text of the published criteria is provided in the appendix.

After these criteria provide a course filter, active selection begins with an application process. Currently, the VentureAccelerator program requires prospective candidates to fill out an 11-page application to initiate consideration. The application mimics the sections of a traditional business plan and is used to gauge a potential entrepreneur's level of commitment and depth of current thinking about their opportunity. In some cases, the mere requirement of the detailed

application acts as an effective screening agent in the quest to select a small number of high opportunity prospects.

Following the receipt and review of the application, the candidate is invited to a personal meeting with the VA Director and his associates to discuss the application, as well as to review questions raised by reviewing staff about the technology and opportunity. If the application is insufficiently detailed, the candidate is offered direct feedback and suggested next steps.

If the application is fairly complete after this set of interactions, the prospective company is subjected to a due diligence process not dissimilar to one that would be applied by a venture capital firm in the consideration of an investment. This process has two prongs: (a) technical due diligence and (b) business opportunity due diligence.

In performing technical due diligence, the program draws on the broad resources of the University to find unbiased domain experts to review the technology for both scientific merit and application relevance. The program recruits a minimum of two reviewers per new technology and asks each reviewer to fill out a standardized questionnaire. These questionnaires contain substantial area for comment, as well as quantitative scores for various aspects of the technology.

In the performing of business opportunity due diligence, VA staff appends the application with relevant market data and other information and distributes it to a panel of at least six independent business reviewers. Each reviewer provides a facet of business expertise that may impact the potential of the proposed company. For example, reviewers may include IP attorneys, senior executives from companies in a similar domain and venture capitalists with expertise in the proposed marketplace. After an independent review and judgment of materials, the panel convenes for a formal presentation by the proposed company founder(s) and to participate in a lengthy question and answer period. At the end of this program, each reviewer fills out a questionnaire and scorecard for the company which is then used to decide the admission of the applicant company.

3.2 Step 2 - Streamlined Licensing and Contracting Processes

Once selected, the licensing and contracting phase begins. In this phase, the company enters into agreements with the University to license any applicable intellectual property (IP) and to license VA mentor services. The contacts stipulate the type of services provided, as well as the equity and fees associated with the contracts. In general, the equity earned by VA is significantly larger than would be earned through licensing alone.

As is customary, faculty and students who develop inventions during the course of employment with University of Maryland or using substantial University resources must assign such inventions to the University. VA is authorized to grant licenses for UM IP to startup companies including such inventors as participants as are selected for VA. It is worth noting that VA has facilitated the development of faculty companies where the IP involved *is not subject to* University ownership, thereby earning the University equity participation in companies that otherwise require no license from the University in order to commercialize.

One critical asset of the Program developed for this phase is its simplified single contract. In researching impediments to investment in University IP, VA surveyed venture capital firms and their counsel. The results of this research showed that professional investors are very leery about entering into discussions with companies that have licensed IP from a University with which they are unfamiliar. The concern is that the work and expense of understanding and, in many cases restructuring, contracts issued by Universities outweighs the commercial opportunities available.

To overcome this perception, the program has spent considerable time and effort creating a single contract with the newly formed company that conforms to investment best practices in the areas of terms and conditions of agreements. For example, license agreements often contain binding “anti-dilution” provisions in relation to equity issued to the University. Anti-dilution provisions stipulate that the percentage ownership of a company may never change even if more shares must be issued to maintain the initial percentage. While at first pass, this provision seems like a win for the University, such provisions most often have a chilling effect on the interest level of outside investors or even employees who might otherwise choose to get involved. Understanding such effects and removing them from consideration widens opportunity for the new company.

3.3 Step 3 - Best-Practices Formation and Set-up

After admission and contracting, the company enters into the set-up phase, unless the initial structure of the company is already determined. In this phase, VA staff, in conjunction with outside service providers partnered with the program, takes steps to properly and efficiently set up the new company in a way that facilitates the hiring of staff and the pursuit of investment. Most often, companies are formed as Delaware C-corporations capable of issuing stock to employees and selling securities. These companies are created with standard governance provisions, shareholder agreements and other well-known and understood structures.

As noted above, the role of outside service providers, such as lawyers, accounts and business consultants, is important. During this phase, VA leverages direct and formal relationships between the program and various outside service providers who view assisting high-potential early-stage companies as part of their structured business development activities. Through such relationships, VA is able to attain the services of top firms and professionals on behalf of fledgling companies that would not otherwise have access to such professional assistance at their stage. This advantage is often critical in saving company founders time and energy through the formation phase - a set of prescribed, but often complex tasks which ironically can smother the business-building process even before it begins.

3.4 Step 4 - Planning and Modeling

The first work phase after Set Up is called the Planning phase. In this phase, the new company proceeds through a series of research activities designed to provide concrete determinations about available markets, their size and their business conventions. Research often includes customer interviews and visits along with quantitative analysis using a wide range of available market data. Often during this phase, the VA will arrange for one or more student interns to join

the company and assist in the research process. These interns provide a valuable service while earning first-hand experience with the entrepreneurial process.

In addition to these ad hoc internships, VentureAccelerator has also created a formal course on technology venture creation called VentureLab. VentureLab is a semester-long immersion course for graduate and select undergraduate students interested in first-hand experience with the issues faced by newly formed technology companies. VentureLab is limited to a small number of students, typically between 8 and 12, drawn from both business and technical concentrations, and it focuses participants on a handful of problems faced by companies in the VA Program at that time. Common VentureLab topics include a range of fundamental start-up issues including market definition, customer buying behavior and financial forecasting.

Once all primary research is completed, company leadership progresses through a set of decisions about the nature of the business that are designed to allow for the construction of the three documents that serve as the core of future business activities: (1) the executive summary, (2) the official company presentation and (3) a detailed working financial model for the business. The first and second documents serve as the core communication devices for the company as it begins to talk with initial customers, investors and employees, while the last document serves as the de facto business plan for the company as it turns its attention to the next phase.

3.5 Step 5 - Plan Testing and Execution

With its three cornerstone documents in hand, the company enters a process of securing the three most important validation points for future success: (1) initial customers, (2) first financing and (3) the building of a well-rounded team. In the first case, VA mentors assist directly with the identification and contact of potential initial customers to test and validate the company's proposed product offerings. Assistance in these matters may include arranging and attending meetings, decision support for pricing, contract terms and conditions and the development of sales channels.

In the case of investment, VA mentors leverage relationships with outside financial sources, as well as their own knowledge of the process, to help client companies secure their first working capital. In some cases, first investments may be made by professional investors, however the use of grant funding, state and federal assistance and other sources of financing are all considered and used as appropriate.

Finally, in the area of team building, VA mentors will use their judgment and experience to assist in the creation of a functional organizational chart, the writing of job descriptions and the sourcing and interviewing of candidates for the open positions. As almost all VA company founders are technologists, frequently the single most important recruiting activity is to find an entrepreneurial business leader to partner with the company's technology leader at a very early phase in the company's development.

VA encourages meaningful faculty and student participation in the start-up ventures commercializing their inventions. Participation can range from executive management to consultant or advisor. As the teaming decisions unfold, VA helps faculty and students determine

their appropriate roles in their startups and navigate associated human resource and conflict-of-interest policies.

3.6 Step 6 - Graduation Phase

As soon as VA companies demonstrate mastery of basic Execution skills, the program begins to consider them as candidates for graduation. It is important to remember that the goal of the program is to “accelerate” a new company on its way to a successful future, not to take it all the way to completion. In general, the fundamental graduation criteria are that the company: (a) display a clear vision of its role in a well-considered market, (b) has secured the initial resources necessary to follow through with meaningful execution, namely a set of initial relationships and some form of initial financing and (c) has recruited and hired at least the beginning of a well-balanced management team capable of delivering the vision.

Ultimately, VA’s objective is the formation and acceleration of scalable companies based on research and discoveries conducted by faculty and students. At all stages, therefore, VA provides hands-on consultation and mentorship, guiding the development of new companies from the laboratory to the “Series A” financing, or equivalent level of company development. The program is designed to proceed through all of the steps in the above process in 12 to 18 months.

4. Case Studies

Since its official launch in early 2005, VA has received dozens of inquiries and has admitted three firms, four when considering a company started as a VA program pilot. VA’s portfolio companies have all enjoyed meaningful advances in planning, revenues, product developments, and team expansion.

4.1 Pixelligent Technologies

During his PhD studies, Dr. Greg Cooper became enamored with optical lithography, the primary technology used to make semiconductor devices. In optical lithography, light is conveyed through a mask, and the mask pattern is then formed in a thin layer of photoresist on silicon wafers. His curiosity led Dr. Cooper to conceptualize a “programmable photomask” to enhance the lifecycle of expensive lithography systems and reduce semiconductor fabrication costs. With no funding or prior business experience, Dr. Cooper formed Pixelligent Technologies to commercialize the programmable mask invention.

In late 2004, MTECH learned of Pixelligent when the firm applied for grant funding from an affiliated unit. Seeing that Pixelligent was seeking university assistance and struggling on its own, VA invited the firm to apply for its then pilot program. The firm was admitted as the pilot company in Q1 of 2005.

VA began by reviewing the firm’s business plan. While the programmable mask is a novel concept, it requires tens of millions of dollars to commercialize, as well as other changes in how chips are produced, to be successful. Dr. Cooper volunteered that he had developed a concept

for a novel semiconductor material (less expensive to develop, and easier to implement) through his efforts developing the mask. While the nanotechnology-based material was only an idea, this material had the potential to save semiconductor firms, like Intel, billions of dollars each year.

By spring 2005, the program had helped Pixelligent chart a new business plan. During the next 18 months in the VA program, Pixelligent would: (a) seek seed funding for further developing this material, (b) demonstrate its efficacy (in small test runs) by developing a prototype, (c) complement Dr. Cooper with additional business talent, (d) seek venture funding to scale the business around this material (then targeted for 2006), and (e) defer pursuit of the more difficult programmable mask until the business was further along.

With a plan in place, execution commenced. In April 2005, the company obtained \$1.1 million in seed funding to prototype the material. In late 2005, a retired DuPont executive, then serving as an advisor to the company, agreed to become interim CEO until VC funding was raised. VA helped facilitate both of these key events.

By early 2006, it became clear the material had strong commercial potential. In early 2006, therefore, VA led a process to complete the company's business plan, financial model, and staffing plan in anticipation of VC fundraising. By May 2006, the firm had a cohesive presentation and was ready to seek significant additional funding. To date, the company has received three term sheets for new investment, each for \$6,000,000 of capital.

4.2 Applied Media Analysis (AMA)

As Dr. David Doerman, a research faculty member in the College of Computers, Mathematics and Physical Sciences (CMPS), became more experienced in the area of mobile computer vision, and he knew he was on to something. In partnership with another faculty member and a graduate student, he formed Applied Media Analysis (AMA), Inc., a company meant to pursue the opportunities inherent his field.

After some time, it became clear to Dr. Doerman that AMA was caught in a trap: with the sole source of revenue being research grants, the only seemingly possible path forward was to win more grants. More grants meant the exploration of more ideas, but not the exploitation of existing discoveries. Soon, the company had several SBIRs and a lot of work to do, but no company focus or clear path to commercial independence.

In the pursuit of help, Dr. Doerman explored entering some of the regional business incubators. He quickly learned, however, that incubators seek companies that are further along in development than was AMA at the time. More importantly, he learned that few incubators offer the methodical, hands-on business mentorship he had in mind when applying. Then, he was referred to VA.

Dr. Doerman began the VA admissions process. Several reviewers saw promise in the area, but, like Dr. Doerman himself, they were concerned about the lack of focus in the company. Nevertheless, because of the promise of the technology, quality of the team, and the sincere

interest in entrepreneurship expressed by the founders, AMA was awarded admission to the program.

As the company was already formed and had staff, the program started with the planning phase. VA staff started an investigation of available markets and market opportunities for the company. AMA has software that allowed common cell phones equipped with cameras to “see and interpret” images presents; the breadth of possibilities was staggering.

Through working with VA – in particular the nine students in the Program’s VentureLab – the company realized that companies in need of mobile computer vision were already using defined symbology (such as bar codes) and purpose-built devices (such as laser bar code readers). While these systems are expensive, the need for 100% accuracy in data collection justified the expense to business customers. They also realized that, while consumers owned the vast majority of installed hardware, they were unaccustomed to using their cell phone cameras for anything other than point-and-click photos when a better digital camera was not available.

Armed with this research, the team reached consensus on what AMA’s most promising opportunities might be. To create a commercial business model they decided to: (a) commit the company to fulfilling the commercial promise of a handful of their most promising SBIRs, namely in healthcare and defense and (b) organize the company as an “enablement and integration” company capable of sharing its expertise with a wide range of companies with interests in the mobile device market.

In the execution phase, VA prescribed five concrete steps which the company followed. First, the company recast its financial plans to meet the new business model. Second, the company charted an IP strategy that would avoid spending company resources in areas unable to provide competitive advantage. Third, the company repackaged its internal software into an integrated platform called MobileVision, distributed as a Software Developer’s Kit (SDK). Fourth, the company built two demonstration applications to illustrate the power of the platform. And fifth, the company initiated a recruiting process to find and hire a Director of Business Development to launch a communications and outreach plan.

During this phase, the VA Director met with the company weekly to monitor progress and, when necessary, took direct actions of behalf of the company. For example, the Director played a major role in the sourcing and recruiting of the company’s first Director of Business Development. Upon successfully completion of these development steps, VA graduated AMA from the program and assisted with the transfer of the company to an affiliated incubator program.

“VA primarily focused our business opportunities and allowed us to explore specific areas of the market,” says Doerman. “The Director helped us look into both the consumer and business-to-business-to-consumer markets, so we can integrate our product into other groups who have existing workflow solutions.” Doerman also credits VA with facilitating the filing of provisional patents, hiring new employees and releasing its SDK.

Today, Applied Media Analysis (AMA) Inc. has generated its first commercial revenues and is positioned as a leading provider of mobile vision solutions for a variety of vertical markets that include healthcare, defense and consumers.

4.3 Affiliate Classroom

Anik Singal first surfaced his ideas to improve the efficiency of online affiliate marketing as a sophomore in the Hinman CEOs Program, an undergraduate educational program run by MTECH to help students pursue their “Campus Entrepreneurship Opportunities” (hence CEOs)^{5,6,7}. Over the course of the next two years, Anik refined his thoughts, ideas and approaches. Affiliate marketing is the name given to the act of promoting products or services for sale online through content and referral links from an independent website.

As subscriptions to the “affiliate classroom” grew, Anik decided he was in over his head. Hours became long and conflicted with his course work. More important, the site was drawing feedback at a pace too feverish for him to act on. In short, he’d created a potentially very successful product, but had not taken the time to build a company around the concept.

Anik began talking to others about partnering with or even joining the company to provide assistance. As an undergraduate, however, he found few would look beyond his age. Then one of Anik’s instructors referred him to VA. VA, being designed specifically for students and faculty with new discoveries, saw immediately the potential in Anik’s ideas and took the young man seriously; initial success, after all, speaks for itself.

Anik formally applied to the VA program and both business and technical reviewers saw promise. The goals they saw for participation in the program were clear: (a) create a formal and functioning company structure around the products, (b) focus the founder’s thinking on one, considerably larger market opportunity, (c) plan financially for growth and (d) prepare the company for venture capital fund-raising.

With these prescribed goals, VA took the company through the building process. First, the company decided on its vision and mission. The process took several in-person customer and partner visits, as well as considerable trade show attendance and involvement. The VA Director and associates attended each of these meetings to give Anik perspective on what was being discussed and to add gravitas to interactions with business partners. Next, the company, in consultation with several networking contacts connected to VA, explored larger business models.

After much work and brainstorming, the company hit upon a model that could move it from a peripheral training company to a more central role in “professionalizing” the entire affiliate marketing industry. VA led the company through a product development planning process. This process identified what future versions of Affiliate Classroom products must look like to fulfill the larger market opportunity. From these sessions, the company formulated several new product initiatives and refinements.

Finally, company leaders worked through a financing model to determine how much progress they could make using just available cash flow and how much and when outside capital would be

required to complete the dream. Determining that current cash flow could carry them quite some distance, they embarked on a product development program designed to enhance the company's value and position.

During the execution phase, VA staff played a substantial role in helping the company manage development, make outsourcing and hiring decisions, find and contract with vendors and hire employees. The company also participated in most business development discussions. VA staff even assisted the company in successfully resolving a failed business relationship that required, before amicable resolution, preparation for litigation.

“Venture Accelerator vastly increased my vision for both the business and the market opportunity,” says Singal. “The program Director has been an immense help in establishing the corporate structure of the company and getting us ready for funding in the near future.”

Today, Affiliate Classroom provides a complete online training solution for affiliate marketers and affiliate program managers. Affiliate Classroom trains affiliate marketers how to increase their website traffic and conversion and Affiliate Managers how to best build their online sales forces. The company closed 2006 with over \$1 million in revenue.

4.4 Zymetis

Dr. Steven Hutcheson is a full professor with a 22 year career at the University of Maryland's School of Life Sciences. Dr. Hutcheson began giving serious consideration to forming a company around his research when he realized that his path-breaking scientific discoveries involving a marine bacterium could have exceptional application to the world of cellulosic ethanol. Cellulosic ethanol refers to the use of non-starch bio-mass material, such as wood chips or corn stover, to produce ethanol, the gasoline substitute.

Currently, the only “economically viable” way to produce ethanol is to distill corn or grain sugars into alcohol. In bio-mass conversion, the producer must first release the sugars bound up in plant cell walls before fermentation. The expense and inefficiency of this “pre-treatment” step is the current bottleneck to the use of bio-mass feedstock for ethanol production. Dr. Hutcheson's patented discoveries regarding the properties of his bacterium may prove to be the critical technology needed to make cellulosic ethanol fermentation affordable.

As he talked more about the concept publicly, several people came forward offering to help. Throughout these early discussions, however, he could not shake the feeling that there would be a “catch” that his lack of business experience kept hidden. Real or perceived, these threats made Dr. Hutcheson consider dropping the idea all together. Ultimately, however, the possibilities were just too great to forget.

After learning more about VA, Dr. Hutcheson decided to apply to the program and he was admitted shortly thereafter. “To be honest, had I not been admitted into the VA program, I most likely would have dropped my dream of building a company,” Dr. Hutcheson reported after news of his acceptance. Work began promptly.

The first order of business was to create a company into which Dr. Hutcheson could license his technologies. VA assisted and consulted with Dr. Hutcheson as he planned the formation of a new C-corporation. One of the first challenges faced by the company during formation was to find a name. The program led Dr. Hutcheson through a naming process from which he selected “Zymetis” – a conglomeration of “Zyme” from “enzyme” and “Metis”, the name of a Greek sea goddess.

Next, the company embarked on an intensive immersion into the world of ethanol production. Through visits arranged by VA, Dr. Hutcheson and the VA Director visited several technologists in the ethanol industry. Interactions included the tour of an ethanol plant in South Dakota, meetings with ethanol experts at the University of South Dakota, and meetings with the top builder of ethanol plants in the country. The program also arranged for participation in an intensive cellulosic ethanol conference, at which Dr. Hutcheson could interact with other cutting edge companies seeking solutions to the problems of bio-mass conversion.

Currently, the company is at the end of the planning process. In addition to further research, the company has embarked on detailed financial planning. With no shortage of funding in the biofuels sector, this planning will help the company determine the size and timing of the company’s financing needs. In parallel, VA is helping the company plan the development and launch of its initial products. The company’s initial product, Ethazyme™, is a proprietary mixture of biomass-degrading enzymes produced by a natural non-GMO organism.

Finally, Zymetis is seeking its first round of equity financing to further develop its technologies, products and processes. The company plans to use the proceeds of this investment to complete research on its manufacturing processes, including the development of a pilot manufacturing facility. In addition, VA intends to aid the company with building out a complete management team and to develop relationships and scenarios to bring the company’s products to market.

5. Lessons Learned

5.1 Entrepreneurship should live at the Point of Invention

The concept of entrepreneurship is most readily associated with the field of business, particularly in academic circles. After all, being an entrepreneur is about starting a new business. That said, nothing has become clearer during the building of the VentureAccelerator Program than this insight: technical entrepreneurship starts with the inventor and, as such, technology entrepreneurship begins with invention. From this vantage point, it becomes clear that, for an entrepreneurship assistance and mentorship program to be most effective, it must be placed as close to the point of innovation as possible, namely inside the technical schools where research-driven innovations occur.

One can observe myriad benefits of starting VA within the Engineering School at the University of Maryland. First, technical faculty and students view VA as being “for them and by them”, rather than “put upon them” by technology transfer organizations or business schools seeking experience for MBA candidates. In three of the four live cases thus far, for example, founders have commented either that they would not have otherwise started a company or they would

have done so outside and completely independent of the University if the VA program had not been available.

Second, having the institution of the college in prescribed alignment with the program has greatly reduced the time and energy that would otherwise go into resolving conflicts of interest and other administrative issues. In its work to define a program during the pilot phase, MTECH found one of the most common perceptions from faculty about company building was simply “I can’t do that here”. Fear about losing tenure opportunity or losing research funding were cited as areas of concern. Faculty also felt that founding a company just “wouldn’t be worth it” financially based upon the standard economic arrangements available to inventors.

Finally, having the entrepreneurship assistance as an official part of their college and available from within their institution sends a powerful message to top faculty and student candidates who want to have their discoveries enter the marketplace. It is anticipated that having the VentureAccelerator program will serve to increase the recruiting strength of UM’s science and engineering departments as they seek top quality faculty and student applicants.

5.2 Quality trumps Quantity

While a drive exists to measure the effectiveness of commercialization programs by the number of patents issued and licensed, the reality of company building is that it takes a substantial amount of time, resources and commitment to bring just one new technology to market. Since it is impossible to provide a high level of hands-on assistance to every technology developed at a university, the application of rigorous due diligence and screening processes are required to find technologies capable of supporting fast-growth, large-scale new companies. With solid due diligence, however, it is possible to make educated selections on “winners” and apply substantial resources behind them to help propel them toward success.

In practice, this fact makes VA a high-work, low-number-of-companies program in search of high rewards for all parties. VA targets a steady-state portfolio of three firms per mentoring professional, with each firm’s period of acceleration averaging 18 months. Since VA presently has only one full-time venture professional, the program has maintained a maximum of three companies under advisement at any one time; however, due to the initial success of the program, it is anticipated that a second full-time professional will be sought.

5.3 Ultimately, it’s about people

As in all human endeavors, the success of a commercialization program based on new company formation is driven fundamentally by the commitment and capabilities of the people involved in the activity. Despite a substantial dose of process, the VentureAccelerator Program as experienced at the University of Maryland has hinged largely on the caliber and disposition of the faculty and students selected to participate and the quality of the advice and judgment provided by the Director and other mentors. The importance of proper selection of “coach-able” and motivated technical founders by committed and experienced mentors cannot be overlooked.

It is our strong belief that other universities that initiate such programs should recruit directors with considerable technology start-up and, if possible, venture capital fund management experience. In our case, the program director was a person with direct early-stage technology company management experience as well as venture capital formation and investment experience. In the formulation of the program, he was supported by four faculty and staff of the Clark School of Engineering who collaborated to develop the program and its processes.

The VA Director, assisted by two colleagues whose main duties were associated with our technology incubator and entrepreneurship education activities, have led or are leading the four companies through the VA processes. Overall, our experience to date is that the proper level of mentoring is such that each full-time professional can handle between two and four companies at a time.

6. Summary and Conclusions

It should be noted that while the four VA companies have benefited greatly from the VA process, and it is believed that they are properly set up to be successful, only time will tell how successful they will be in the long-term. Nevertheless, the successful initiation of the Program has generated a number of benefits and rewards. UM and the Clark School are benefiting from evidence of leadership, recruiting differentiation, and financial development. Realizing that there is a probability associated with the success of each startup company, the fact that an orderly process and experienced mentoring is applied to each VA Company should increase the chance of success. Accordingly, the region should benefit from economic development gains vis-à-vis job and tax revenue growth.

Finally, societal benefits should be enjoyed because of graduating skilled technologists with entrepreneurial (or intreprenurial) inclinations, as well as by bringing valuable innovations to customer markets. It is believed that the VentureAccelerator Program could be replicated at other universities.

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APPENDIX

Detailed Criteria for VentureAccelerator

VentureAccelerator (VA) seeks to assist developers of new technology at the University of Maryland in the formation of new companies that pursue the full commercial potential of their discoveries. Unlike other technology advancement programs at the University, VA works exclusively with technology founders personally committed to new enterprise formation.

To be considered for the VentureAccelerator Program, a new technology team must meet all of the following criteria:

1. Technology Founders employed by or studying at the University of Maryland

While many great technologies are developed in Maryland and the Mid-Atlantic region, VA services are currently available only to existing faculty, graduate students, and select undergraduate students of the University of Maryland.

2. Technology Founders willing to commit to the development of a commercial enterprise

Most successful emerging technology companies are co-managed by technology pathfinders and seasoned business executives. VA studies a potential company's founder and/or founding team to determine their "entrepreneurial spirit"- the true level of commitment to bringing their technology to market and willingness to put the company in its strongest position to succeed commercially.

3. Technology developed beyond "pure science"

Much great scientific research goes on at the University of Maryland; VA exists, however, to help form new commercial enterprises in a period of 18 months or less. VA, therefore, can only accept applications from teams with technology capable of going to market within one year of admission. In addition, VA cannot evaluate technologies that have not yet, at a minimum, completed "proof-of concept". In all cases, applicants must have a working commercial prototype or a concrete path to one within six months of acceptance to the program.

4. Product plans with clear competitive differentiation, preferably through unique, protected technology

For VA to assist in the development of a new company, its future products or services must be capable of compelling customers to purchase consistently. In addition, the underlying technology must also allow the company to fend off competition, near and long term. Technologies with existing patent protection preferred. In all cases, however, an applicant's products must have IP that allow defensible market share.

5. Target markets receptive to new entrants

While VA understands that new technologies don't always have just one commercial opportunity, applicants must be able to demonstrate at least one clear addressable customer base for their new technology. Before accepting a new applicant into the program, VA must validate a prospective company's assumptions regarding customer needs and competitive superiority.

6. High potential for sustainable, scaling revenues and earnings

As VA's mission is rooted in the formation of successful, sustainable technology firms, VA studies an applicant's future business prospects, including its target markets, long-term product or service development plans, and pricing potential to determine the likelihood that a sustainable, fast growth, highly profitable firm can ensue. All other criteria being equal, VA seeks to work with fledgling companies that, in its assessment, have the largest addressable markets possible. While VA favorably considers technologies with scale potential in large and growing markets, VA may also accept technologies with well-defined niche leadership opportunities.

7. Ability to locate substantial operations in Maryland

Whenever possible, VA is dedicated to advancing economic development in Maryland. VA will seek to admit companies with no identifiable barriers to conducting business operations in Maryland near and long-term.