SONORAN TRANSPLANTS:

AN INVESTIGATION FOR TECH LAUNCH ARIZONA

By

CAMERON CHASE MILLER

A Thesis Submitted to The Honors College

In Partial Fulfillment of the Bachelors degree

With Honors in

Entrepreneurship

THE UNIVERSITY OF ARIZONA

AUGUST 2012

Approved by:

Dr. Matthew Mars

McGuire Center for Entrepreneurship

The University of Arizona Electronic Theses and Dissertations
Reproduction and Distribution Rights Form

Name (Last, First, Middle) MILLER, CAMERON, CHASE	
Degree title (eg BA, BS, BSE, BSB, BFA): BSB	
Honors area (eg Molecular and Cellular Biology, English, Studio Art): ENTREPRENEURSHIP	
Date thesis submitted to Honors College: 11/19/12	
Title of Honors thesis: HONORS THESIS: SONORAN TRANSPLANTS "AN INVESTIGATION FOR TECH LAUNCH ARIZONA"	
:The University of Arizona Library Release	I hereby grant to the University of Arizona Library the nonexclusive worldwide right to reproduce and distribute my dissertation or thesis and abstract (herein, the "licensed materials"), in whole or in part, in any and all media of distribution and in any format in existence now or developed in the future. I represent and warrant to the University of Arizona that the licensed materials are my original work, that I am the sole owner of all rights in and to the licensed materials, and that none of the licensed materials infringe or violate the rights of others. I further represent that I have obtained all necessary rights to permit the University of Arizona Library to reproduce and distribute any nonpublic third party software necessary to access, display, run or print my dissertation or thesis. I acknowledge that University of Arizona Library may elect not to distribute my dissertation or thesis in digital format if, in its reasonable judgement, it believes all such rights have not been secured. Signed: _____ Date: 11/19/12

Last updated: Nov 15, 2009

Thesis

For the purpose of this study, we have to come up with recommendation for Tech Launch Arizona (TLA). TLA headed by UA President Eugene Sander, is a hub that facilitates UA students and researchers as they bring their inventions to the marketplace. According to the Daily Wildcat, Sander and Len Jessup are in charge of this program, which will provide direct avenue for UA inventions to be licensed out.

In addition to providing recommendations for TLA, we will also analyze Sonoran Transplants, a venture started from the UA, which later failed to commercialize its technology. Since Sonoran Transplants was intimately involved with OTT, we will analyze the reasons behind its downfall and provide recommendations based on this research.

Our Team

Ali Hussain: : Ali is an Accounting and Entrepreneurship major. He has managed his family's home goods store for five years in Pakistan. During those five years he was able to increase the store's sales by 200%. This increase in sales was during the most recent recession when his competitors' sales were decreasing. Ali has also done business with China and U.A.E. as they imported their products from these countries.

Blaine Light: Blaine is an Engineering Management student with a concentration in Entrepreneurship. He also has minors in Spanish, Mechanical Engineering, and Mathematics. He recently was awarded the Outstanding Graduating Senior in Engineering Management.

Cameron Miller: Cam holds bachelors degrees in Finance and Entrepreneurship. He has past small business experience after founding a commercial landscaping service in the suburbs of Chicago, Illinois. Cam began his leadership experience through his presidency with the Delta Chi fraternity, the largest chapter in the nation. Additionally, he is the current President of the UA Real Estate and Development club.

Who is Sonoran Transplants?

Sonoran Transplants specialized in the grafting of tomato seedlings, in order to combine the best tasting plants (i.e. tomatoes) with the strongest roots. Sonoran Transplants was created through a team primarily consisting of: UA horticultural engineering professors Cheiri Kubota and Gene Giacomelli, a Thunderbird MBA Intern named Luis Morales, and business experts Robert Shatz and Ron Richman.

Board of Advisors

An advisory board also oversaw this team. This board consisted of:

Dr. Gene Giacomelli – Director, Controlled Environment Agricultural Center, University of Arizona – Controlled Environment Expert.

Dr. Toyoki Kozai - President Chiba University and father of closed-type plant incubation system licensed to Taiyo Kogyo.

Dr. Chieri Kubota – Associate Professor, CEAC, Horticultural Engineering and Studied under Dr. Toyoki Kozai in Japan – Closed System Expert.

Dr. Robert Ashley - Biopharmaceutical and Startup Expertise

Dr. Judith Brown – Associate Prof, CEAC, Plant Disease Expert.

Dr. Guy Cardineau - Research Prof., ASU BioDesign Institute Inventor with 18 issued and 9 patents pending in plant-made genetics.

Business Leaders

Ron Richman

Mr. Richman has had extensive experience (30+ years) within IBM managing and developing strategy for e-business, and manufacturing on a worldwide basis as well as managing a variety of consulting groups. He has 15+ years of experience cultivating client and vendor relationships and growing sales and market opportunities, and guiding development of flagship products. Talented as a marketing and operations manager, Dr. Richman is adept at applying quality management methodologies to reduce production and operation costs. He also was part of several teams responsible for economic development within Boulder, Colorado and for the Department of Energy and has started up numerous companies in Boulder, Colorado and Tucson, Arizona.

Robert Shatz

Mr. Shatz started his career in Japan as an analyst in the Investment Research Department for Nomura Securities after graduating from the University of Arizona and Thunderbird School of Global Management. He transferred to Institutional Research and Sales in the US. brokerage subsidiary after 3 years. Through his knowledge of Japanese, cross-cultural communication, investment research, and finance, he helped to grow the Los Angeles branch operations tenfold

in 3 years. He was promoted to top management by facilitating joint ventures, strategic partnerships, and start up investments between Asian investors and American companies. Transacting over $1 billion, he came back to Tucson to raise his family and focus on sustainable development in Arizona.

What is the technology?

Technology Overview

This team invented a way to connect a strong root to a strong plant by growing seeds and grafting them together at a certain stage. (Graft means surgically attach these two parts together). The general thought process was that the best tasting fruit plant strains could be grafted with the roots of wild plants that generally had less susceptibility to diseases and poor weather conditions. This technology started with tomatoes, because Dr. Kubota had extensive knowledge on the grafting process for tomatoes. Furthermore, Eurofresh, a large greenhouse developer in Willcox, Arizona, offered to buy the tomatoes if their production yield was greater than other tomato yields. The picture shown below depicts an example of the tomato seedlings being used by Sonoran Transplants.

Who Created The Technology?

Although the technology already existed behind grafting the plants together, Dr. Kubota found a way to make the grafting more effective. Before she invented these techniques, only 85-90 plants were successfully grafted. By making the machining process more reliable and efficient, Dr. Kubota pioneer a way to successfully graft 95 out of 100 plants.

Where Was It Created?

To graft the strong roots to the strong plants, local Tucsonian technology and greenhouses were required. Dr. Giacomelli supervised this process. Since he was director of the CEAC farm three miles north of campus, he allocated university resources (greenhouses, machinery) to undergo this process. Below is a picture of a greenhouse containing a closed plant incubation system similar to the one used by Sonoran Transplants.

Why Was the Technology Created?

Prior to Sonoran Transplants, Eurofresh (the largest tomato grower in Tucson) imported its tomato sprouts from British Columbia, Canada. Sonoran Transplants saw this as an opportunity for multiple reasons:

1. Importing from a foreign country has tariffs and taxes associated with it.
2. Tomato flowers, which produce tomatoes, were dying in transportation. By growing the tomato sprouts locally, they could increase the yield.
3. A local supply of sprouts implied enhanced reliability, timing, and was supply-shock resistant, simply due to the proximity of the sprouts. In other words, there was much less risk associated with having a local supply, which could deliver more plants for the same cost to the consumer; it was a win-win.

SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)

Internal	
Strengths	**Weaknesses**
1. Technology for grafting strong roots with strong plants to create disease resistant plants 2. Connections with farmers in Arizona	1. Only 1 customer, EuroFresh 2. Dependent on the monsoon being particularly wet, which it wasn't.
External	
Opportunities	**Threats**
1. Possibility of producing pharmaceuticals using the tomatoes, from creating a partnership with ASU's agriculture department. 2. Ability to expand production beyond tomatoes to create a whole market of disease-resistant crops using natural means.	1. Competitors to EuroFresh could be making the same technology 2. The technology was readily used and available in Japan, so any other entrepreneur could import it to Arizona.

Why is Tomato Grafting Innovative?

Sonoran Transplants produced grafted tomatoes that would flower 10 days earlier than traditionally grown tomatoes. Their tomatoes would flower after 10-14 days in a closed environment as opposed to 20-24 days. They attested that this would yield a six percent addition to sales volume per year based on Japanese industry estimates formulated by Dr. Kubota. Sonoran Transplants also stated that another advantage they held was that they would

lose fewer plants once in the greenhouse. The picture below depicts a grafting robot that is in the process of producing the finished product.

Competitive Advantages

Sonoran Transplants had three main competitive advantages. The first of which was that they were unique to North America. With the exception of Conviron, a company that performed grafting almost exclusively for research purposes, Sonoran Transplants would have been the sole commercial plant propagation company in North America. Outside of North America the closed-system technology was primarily used in Japan. The President of Chiba University, the preeminent agricultural school in the country, pioneered the closed system technology and was also on Sonoran Transplants board of advisors.

The second competitive advantage was Sonoran Transplants connection to the University of Arizona's Controlled Environment Agriculture Center (CEAC), which was regarded as one of the world-class schools in the multidiscipline combination of Engineering, Plant Sciences, and Biotechnology. This provided Sonoran Transplants with help in running the actual greenhouses

because the CEAC educated and trained students to properly manage the greenhouses as well as provide Sonoran Transplants with general expertise.

The third and final competitive advantage was Sonoran Transplant's production and research tools. They intended to have their production facility enable them to continue researching for new drug and plant-made protein discoveries.

Patents and Intellectual Property

Due to the nature of this venture, there was no intellectual property at the inception of Sonoran Transplants. They used a pre-existing procedure from Japan to graft these plants. They had the possibility of patenting the improvements on this procedure, but the venture did not last long enough to pursue these improvement patents. Therefore, their competitive advantage was due to the fact that they were in close proximity to the tomato grower, Eurofresh.

Competition

Since this technology was in Japan, they had no direct competition in United States. Sonoran Transplant's nearest competition was a greenhouse grower in Canada. However, their indirect competition was normal tomato plant growers.

Investigation

Description of Environment

Sonoran Transplants started in 2008, however they were not able to successfully commercialize their technology. We have started this study in 2012, four years after they failed to commercialized it, thus, when we started the study, it was long past the life of the venture.

Current status

The venture was unfortunately unable to complete its trial run at Eurofresh. According to Dr. Giacomelli, the tomatoes in the trial run were progressing at a slightly slower rate than expected, so Eurofresh stopped production. It is also possible that given the low level of venture funding available in the Tucson market, funding was hard to come by, and Sonoran Transplants could not grow without additional funding. Therefore, after Eurofresh stopped the trial run the Sonoran Transplants venture faded. This could be attested to the fact that there were no connections with other tomato growers, as well as no additional funding to continue the venture.

Recommendations to TLA

Create a Diverse Platform to Commercialize University Property

Our first recommendation to TLA is to create a diverse platform to commercialize university property other than intellectual property e.g. university property, university time, other university resources etc. The reason that TLA should create other platforms is because OTT specializes in intellectual property, which usually creates more legal formalities for new ventures as they are dealing with intellectual property issues. If, instead, they deal with another department that is focused on the use of commercializing other university's resources, they are able to deal with much less legal formalities and can spend more time focusing on their business. Sonoran Transplants provides a good example because they did not use any intellectual property that belonged to the university, but still got involved with the OTT because they were using the university's time and resources. Thus, when they got involved with the OTT, they had to take care of lot of legal work, which took a substantial amount of their time. They could have spent this time focusing on their business, identifying customers, and doing market research. In short, if TLA creates a separate department or committee that focuses on commercializing other university facets, such as the university's time and resources, they can help the new ventures save a lot of their faculties' valuable time and energy.

Emphasize the "Aspect" Part of Commercializing the Technology

Secondly, we feel it's important to note that a substantial part of the professors who work on developing the technology are not motivated by the money. They do not get promotions based on how many patents they create or how much money they make by doing business. They get promoted on the basis of how many articles they publish and how much research they do. Our interviews have led us to believe that many professors would prefer to receive TLA-provided incentives for commercializing their technology, such as funds for furthering their research or money for their respective departments. If we again take the example of Sonoran Transplants, its advisory board did not join the business because they were interested in making money, but instead joined the business because their arrangement was that Sonoran Transplants would give part of the profits back to the CEAC department for future research. Thus, if these researchers are incentivized by giving part of the net profits back to their department or towards their research, they will be much more motivated towards working for the business rather than just being on the advisory board or commercializing the technology solely to make money. Overall, incentivizing the researchers not only allows them to work hard on the technology, but also creates more opportunities for business-minded individuals and the university to make money from researcher's technology. Thus, it becomes a win-win situation for both parties involved.

Create Funding for the New Start-Ups

Many great technologies have a huge potential for success but limited funds. Our third recommendation for TLA is to create sources of funding for these new ventures. We know that funding in Arizona is generally short and getting the funding at the right time can make a huge difference for new start-ups. If we continue to take the example of Sonoran Transplants, one reason it was not able to successfully commercialize its technology was because it failed to raise funds for a large order from a very large customer. If Sonoran Transplants had received funding from an external source, it would have been able to successfully commercialize its technology. Thus, access to funds can become the difference between being successful and unsuccessful for a new venture. The way that TLA can create funds for new start-ups is to get some Venture Capitalists and Angel Investors on board.

Create Teams with Diverse Backgrounds e.g. Business and Engineering

Many researchers who try to commercialize their technology either do not understand general business knowledge or lack the interpersonal skills to effectively communicate with business professionals. Dr. Giacomelli from Sonoran Transplants mentioned that whenever they tried communicating with business professionals there was a huge disconnect, but whenever his business intern tried communicating with business professionals, he was able to communicate promptly and effectively. In addition to this, Mr. Shatz also mentioned that when they went to the Desert Angels to get funds they did not qualify for their final round, inevitably resulting in the inability to acquire any funds. As many people that are familiar with the industry know,

getting funding from groups such as the Desert Angels is a very difficult and very competitive process. In light of this we believe it would have helped them to have more business professionals or interns on their staff.