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An Integrated Education and Technology Commercialization Program: The Idea to Product®[1] Competition and Related Courses*

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Universities have three missions: education, research and public service. The Idea to Product® program supports the service and research missions of a university. Faculty at UT Austin developed I2P® as an educational program; previous publications have stressed the pedagogical approach and educational value of the program. This paper examines how the program, which includes both courses and competitions, fosters technology commercialization, thereby supporting the research and service missions of a university. By examining student projects, the I2P® program's support of university missions and technology commercialization can be illustrated. Ultimately, the I2P® Program helps to foster an entrepreneurial culture within a university.

Keywords: Idea To Product; i2; international; entrepreneurship; technology commercialization; innovation

INTRODUCTION

UNIVERSITIES have three missions: education, research and public service[2],[3]. Faculty at UT Austin developed I2P® as an educational program: previous publications have stressed the pedagogical approach and educational value of the program. Evans *et al.* emphasized the educational focus of the program [1]. This paper examines how the courses and competitions provided by the program support the research and service missions of the university and foster technology commercialization. Several student projects from the I2P® program are described in order to illustrate the program's promotion of the commercialization of technology and show how I2P® can support the entrepreneurial culture of a university. Idea to Product® is not a business plan competition[4].

Business plan courses and business plan competitions have proved to be useful and productive elements of entrepreneurial education. They promote and encourage the creation of new ventures and develop the entrepreneurs to build and operate these ventures. However, business plan competitions do not inherently facilitate technology innovation[5]. A business plan describes how new products[6] can be introduced into the marketplace only after those products exist. The development of products and services (innovation and engineering) per se is not within the scope of business plan competitions or courses. Most business plan courses and competitions accommodate business plans based on some technology, and there is a trend toward more technology-based plans [3], but there is little in the literature to guide the earlier stages of the commercialization of the technology that are required before one develops a business plan.

Consider two approaches for technology commercialization. Technology commercialization as a result of "opportunity pull" is driven by predetermined needs [4]. Opportunity pull can be stated as a problem in search of a solution. The solution may be driven by technological develop-

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[1] The University of Texas has registered the trademark for the competition. The University does not charge a fee for the use of the mark, but control of the mark provides quality control for I2P® events and reduces confusion between I2P® and business plan activities.

[2] As an example, the mission statement for UT Austin is "to achieve excellence in the interrelated areas of undergraduate **education**, graduate **education**, research and public **service**." (Emphasis added.) www.utexas.edu/welcome/mission.html.

[3] These mission statements may vary in specifics. As an example, the Mission Statement of Purdue includes "**discovery** that expands the realm of knowledge, **learning** through dissemination and preservation of knowledge, and **engagement** through exchange of knowledge." (Emphasis in original.) http://www.purdue.edu/strategic_plan/pages/westlafayette/wl_mission.html

[4] See as an example: www.ideatoproduct.org.

[5] "Innovation" is used here to mean the transformation of knowledge into the products, processes, systems, and services capable of supporting economic development, wealth creation, and improvements in human standards of living. (Adapted from the NSF definition available at http://www.nsf.gov/pubs/2006/nsf06550/nsf06550.htm.)

[6] "Product" in Idea to Product®, and as used in this paper, also refers generally to services, processes and systems.

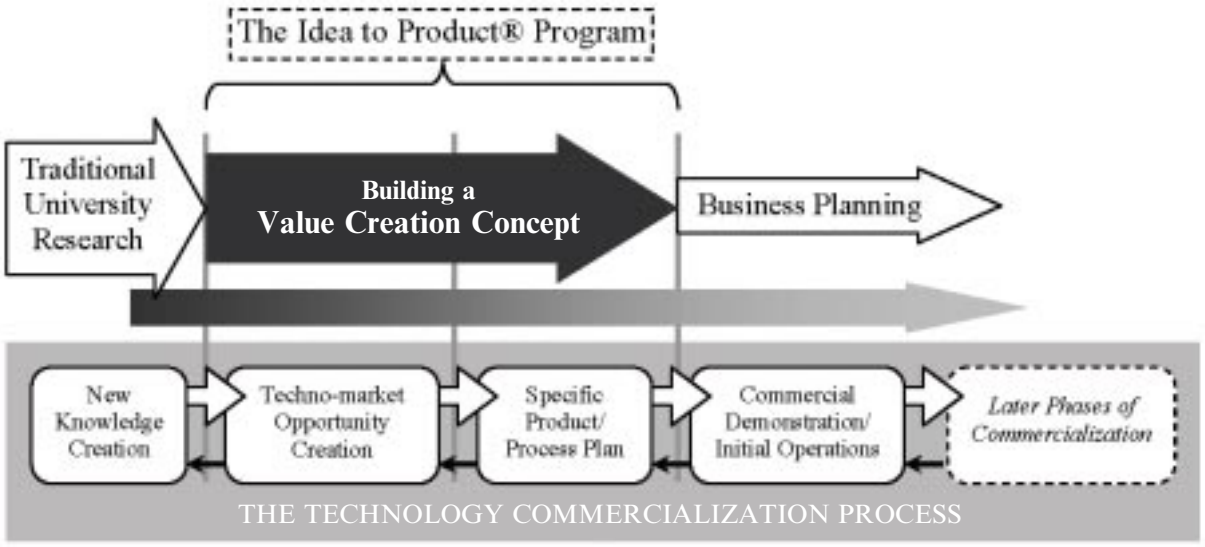

Fig. 1. The innovation gap and The Idea to Product® program (adapted from Jolly [5]).

ment or by previously existing technology. Innovation from university technology frequently addresses another pattern of commercialization where the desire is to match a technology with a market in which the technology can be an agent for value creation. This is often referred to as "technology push".[7] Jolly [5] describes the outcome of this early process in terms of having "techno-market insight" or what may be more commonly called a breakthrough. The process of identifying a market for a technology involves synthesis. It is an active process in which the tie between a technology and a market is generated, not simply discovered. It can also be generated in an iterative process. In terms of innovation education and in terms of facilitating the technology innovation process, more structure is needed. Drucker [6] states, "[prosperity] requires that innovation itself be organized as a systematic activity."

THE VALUE CREATION CONCEPT

Idea to Product ® is about building a value creation concept

Research universities create new technologies. Entrepreneurs create new technology-based ventures (or at least competitive plans for ventures). There is a gap between the two. The literature describes the technological developments that must occur between the conclusion of university research, and producing what is demanded by the market. This "technology gap" is significant, but incomplete. There is also a gap associated with a lack of understanding about the relationship between technology (technical knowledge) and defined market needs. One must create the value proposition for the market and for those wishing to commercialize the technology before the technical knowledge can be transformed into products and processes that are capable of creating value. This implies that an "innovation gap" exists between having the technology and having the conceptual understanding of an economically viable and sustainable method and plan for creating value based on that technology. A business plan is created after the "innovation gap" has been crossed.

The Idea to Product® program draws information and a perspective from university research and from business development to support the conceptually challenging process that connects them. Faculty members at The University of Texas at Austin created an integrated education and technology commercialization program by drawing together elements of marketing, intellectual property, technology-specific expertise, and the overall commercialization process. This is illustrated in Fig. 1.

The activity linking traditional university research and business planning, as illustrated by Fig. 1, is the process of creating a value creation concept (VCC). The narrowing arrows indicate that not all research can be considered in the technology commercialization process and not all VCCs can be carried forward into business plans. Building from a technology to a VCC involves a conceptually difficult, strongly iterative, case-specific set of tasks. It is a process that naturally precedes the formation of technology-based companies (and not-for-profit organizations). Based on the experiences of creating technology companies and the Idea to Product® program, the authors have realized a common structure for this process. Teams are guided through the process while preparing for the Idea to Product® competitions or preparing final reports for related courses. The input to the process is 'a technology' (an

[7] Note that successful technology commercialization require a market, regardless of the process (technology push or opportunity pull).

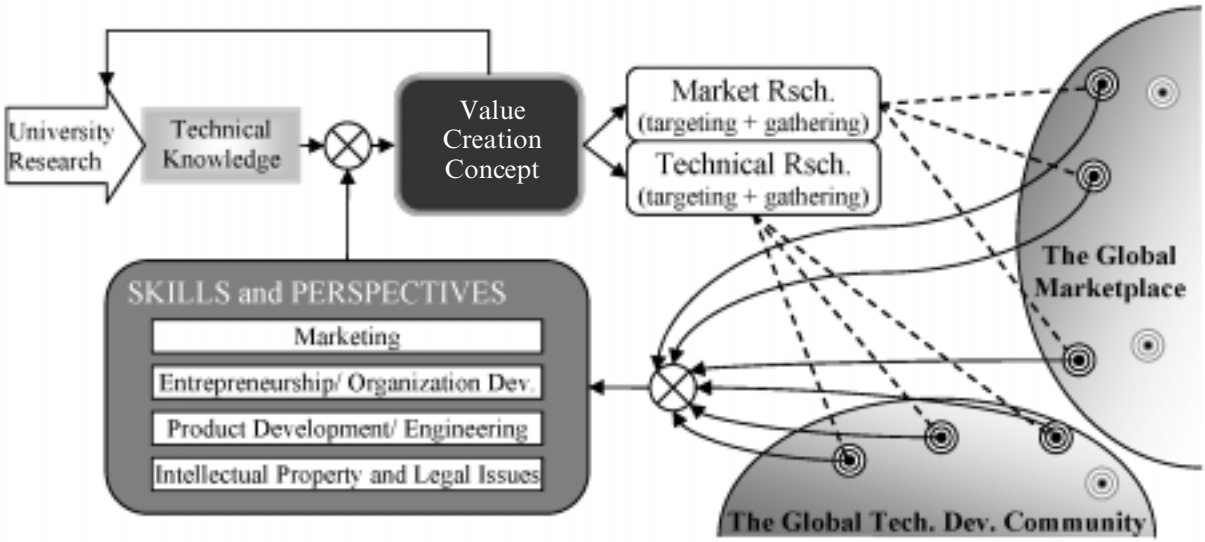

Fig. 2. The Idea to Product® process: Building the value creation concept.

arbitrary unit of technical knowledge). The output and what the team continually refines during the process, is a value creation concept[8] based on that technology. The VCC becomes a clear idea about the time and funding required to begin creating value in a particular market[9], the potential rewards for doing so[10], and the different types of risks involved[11]. VCCs may describe an opportunity for a business, or they may not. The most economically valuable path can be to find another technology or opportunity upon which to work. This I2P® process, illustrated in Fig. 2, begins at the moment a potential application for new knowledge is considered and may proceed concurrently with the research itself. A team working through this process builds their VCC from market and technology research, which is examined and incorporated into the project via marketing, product development (engineering), legal (including IP) and organizational development (entrepreneurial) perspectives. The VCC in turn informs and refines the market and technical field research (as opposed to university 'research', which creates new knowledge). This includes how the project is communicated to different audiences and what audiences or sources are targeted by the research. These targets often change during VCC development. The case studies presented below further illustrate the process of developing a VCC for emerging technology.

Education about this early stage of technology commercialization, then, is about providing resources and guidance that promote team development and the synthesis of an appropriate value creation concept. Again, referring to Fig. 2, there are many disciplines and skills that are required to build that concept. These fall into three main categories: technical (engineering and sciences), business (marketing and entrepreneurship) and law (IP, transactions and contracts). A team lacking in any of these areas must learn about and seek support in the others.

THE IDEA TO PRODUCT® PROGRAM

There are two paths that the I2P® Program at UT Austin provides for students interested in technology entrepreneurship[12]. There are no prerequisites to taking either path. Both allow student teams to construct their own VCC for an emerging technology. Several teams have taken advantage of both paths.

One path is to take the Enterprise of Technology graduate course (EOT), which is cross-listed in the School of Law, the McCombs School of Business, the College of Natural Sciences and the College of Engineering. Students form multidisciplinary teams on the first day of the class with at least one business, one law and one technical (science or engineering) student on each team. The first section of the course provides an overview of the technology commercialization process from several different authors. Teams create criteria to

[8] The term 'value' applies to both for-profit and not-for-profit innovation.

[9] The time and funding required to reach the market should consider technology development, manufacturing development and costs, IP development, regulatory barriers (such as FDA trials), the potential rewards and the risks.

[10] The potential rewards are based on the value proposition to both customers and investors, the market size, well defined market interest, market trends, and the overarching value chain (suppliers and customers) associated with the potential product.

[11] An account of risks will by nature be incomplete but should include legal risks (including IP and liability), market based competition (including barriers and competitors) and technical barriers (including competing technologies and especially related to complementary or enabling technologies).

[12] Students may also participate in business plan competitions and related courses. See for example: G. M. Cadenhead, *No Longer Moot*, Remoir, (2002).

facilitate their choice of a technology (from the consideration of at least three) to focus on for the semester. They are encouraged to choose UT technologies and sometimes choose from the list available at the UT Office of Technology Commercialization. Teams then build a conceptual map of the technology based on its interconnected functions. This activity serves two purposes. Technical students, especially those who are researchers on the chosen technology, quickly develop a capacity for describing the features of the technology effectively to a general audience, while non-technical team members can quickly comprehend the technology. The team also collectively develops an ability to describe the technology, which is critical for primary market research. The course features lectures providing overviews of marketing, intellectual property and other strategic commercialization topics. As students learn about the disciplines required to build a VCC they are also engaged in the process of building a VCC for their selected technology. Teams examine at least three distinct markets, prepare appropriate criteria from course reading and choose one market that has the best opportunity (as they define it) for value creation. At the end of the semester, teams present their VCCs and clear recommendations in written and oral form to a panel of instructors and entrepreneurs. VCC development has the most rapid progress in the final weeks of the semester, helped in part by the required dry-runs of presentations and drafts of reports. The drafts and dry-runs facilitate continued iteration of the value creation concept at an important time. Near the end of the semester the understanding of product development and IP, as examples, are most fully developed and teams can work from a large amount of information (from research into the market and competing technology). Recommending only academic research or stopping work on a particular technology are both perfectly valid recommendations. It is possible that stopping work is the best (societal or market) value creation for a technology.

Students may also choose the second path by participating in the Idea to Product® Competition[13]. The competition is an alternate, extra-curricular educational experience, similar in content to the Enterprise of Technology course. Both the competition and the course provide information in marketing, IP, general business, entrepreneurship and facilitate the iterative process of building a VCC. The I2P® kickoff event features speakers who provide an overview of the technology commercialization and are often technology entrepreneurs themselves. Faculty, students and representatives from the community (attorneys, entrepreneurs, technology commercialization experts) serve as lecturers for evening workshops that cover communications, marketing, IP and other related subjects. Students can attend these lectures throughout the semester of the competition. Students form teams informally. There are no requirements about the number of academic majors represented in competing teams. For the first phase, teams prepare a brief report organized around several key questions about the technology, the potential market and the competitive advantage that the technology can establish in that market[14]. A panel of students, faculty and business leaders evaluate the reports and choose semi-finalist teams. Semi-finalist teams are paired with mentors who have experience in some facet of the technology commercialization process. The mentors and Web-based materials, including videos of past winning teams, guide teams in their development of a VCC. The late stage rapid development that is seen in the final weeks of the EOT course is also promoted by both a presentation dry run and a day between the semi-finals and finals that allows teams to put forward their clearest and most effective VCCs and related presentations on the final day.

The case studies below resulted from student participation in the Idea to Product® program. Teams and projects from many of the course offerings and from each of the competitions offered at UT have continued beyond the Idea to Product® process[15]. VCCs created by students have led to additional research funding, entries in business plan competitions and the creation of new ventures. This is a noteworthy track record that indicates that the competition and courses, while providing education, are also facilitating technology commercialization. In other words, the competition is providing a means of creating and innovating in the gap between the creation of a technology and the preparation of a business plan.

CASE STUDIES

The authors have chosen nine projects to illustrate the influence of the competitions on actual technology commercialization activity. The following descriptions open with some background to each of those projects. Next, there is a description of the process of preparing for and competing in the competition, which is followed by an outline of the continued development of the projects after the competition. The projects include different types of technology, teams with different backgrounds, and team members with different goals and outcomes, which vary from additional research to venture-backed startups. Yet, each team made significant

[13] The competition Website contains an outline of the activities, submissions and procedures for the I2P® UT Austin Competition: www.ideatoproduct.org/ut/.

[14] Up to 73 student teams have submitted reports for a single competition.

[15] I2P UT Austin had been hosted in 2001, 2002, 2003, 2004, 2005 and 2006. I2P Global had been hosted in 2003, 2004, 2005 and 2006. The Enterprise of Technology course has been offered each long semester since Fall 2000.

Fig. 3. See Footnote 16

progress with the support of the competition or related courses.

Three of the examples are teams from other universities that competed in one of the I2P® International Competition events. These examples illustrate how I2P® fits in with a variety of different technology commercialization programs. There are many ways to support the development of a value creation concept. Two examples represent joint projects between two universities, and two show the international potential of the I2P® program. It is more difficult to assess the specific role of the competition in the commercialization of these three projects, but in all cases competing in I2P® preceded additional competitions and further progress in the technology commercialization process.

Case 1: Intelilink (2001 I2P® UT Austin)

Ted Gaubert, a sophomore electrical engineering student, invented a wireless digital network that at the time was superior to the available semi-digital systems and supported a city-wide wireless internet solution several years before the potential of such a concept was described more widely in the media. The most prominent advantages came from the use of small, inexpensive off-the-shelf transmitters, a simple method of setting up and operating an array of transmitters and the use of unlicensed radio frequencies. He and a partner, Adam Janca, competed in the inaugural I2P® during the Spring semester of 2001. The Judges for the competition decided that there were two teams that deserved top honors and awarded two first place awards.

After the competition, Gaubert was able to start a company and attract the interest of local investors. After continuing school and working on his company, he discovered through the market and large competitors that his concept was right. He had identified an opportunity and created an appropriate solution to address it. However, many large and well funded companies (AT&T, Cingular, T-Mobile and Sprint) also began to pursue a similar solution. Market-based competition undermined the opportunity. The same function was provided in another way. Gaubert is pursuing doctoral studies in biomedical engineering and placed second in the 2005 I2P UT Austin Competition with an entry based on his current research.

Case 2: Active Suspension System (2001 EOT Course)[16]

In 2001, a team of students (Richard Hayes, Jennifer Parks, A. J. Warner, Mike Simmons, Sung-Yeol Choi) examined a technology created in the UT Center for Electromechanics (CEM) in the Enterprise of Technology course (a course related to the educational material and process supported by I2P®). They also formed a team for the first Idea to Product® competition that spring. Their technology consisted of an active suspension system initially envisioned for military vehicles[17]. The team researched three promising markets (military, fleet and luxury vehicle) and established the cost sensitivity, competition, overall interest in each market. This allowed them to create a map for the commercialization of the technology including critical milestones in cost and performance. Their work allowed the inventors to obtain over $1million in additional research funding and two technology commercialization licenses. As of this writing the development of the technology continues.

Case 3: Omni Laser Line Generator (2002 I2P® UT Austin, EOT Course)[18]

Dr. John Taboada, a law student with an electrical engineering doctorate, and his father, invented and patented an optical device. The device is a lens assembly that spreads a beam of laser light into a radial plane and he and his father had built several prototype products using the technology. One advantage over many commercial laser leveling systems, as an example, is that the prototype devices had no moving parts, meaning lower manufacturing costs and higher reliability. Dr. Taboada enrolled in the EOT course in the Spring of 2002 hoping to explore the commercialization potential of his invention. He connected with Scott Evans (Mechanical Engineering),

Georgios Georgakis (Law), Ed Cook (Biochemistry) and Brett Underhill (MBA) to form a team. During the semester John entered the I2P® competition leveraging the material prepared in the course.

The team analyzed the potential of several markets, including scientific research devices, commercial construction and home alignment tooling. The team connected the features of the technology to needs in several different markets. In addition, for several markets they were able to establish target costs or performance guidelines that could guide further development. They focused on the construction market for the class, but also created a more general understanding of

[16] The image of the suspension actuator was taken from the final report for the Enterprise of Technology course.

[17] The suspension system allowed an Army vehicle to traverse a rough terrain course at double its previous maximum speed during initial tests at the US Army proving grounds in Yuma, Arizona.

[18] The image of the laser line device is from http://www.taboada.com.

Fig. 4. Laser line device (see http://www.taboada.com).

Fig. 5. Silicon carbide evolution.

the technology and how it could be mapped to markets. The early consideration of IP, marketing, and other commercialization issues helped to create a template that could be used quickly for a variety of markets.

John and his father continued to work on the product after the course. Their goal was to create a lifestyle business. They used the general market understanding initiated in the course to pursue several markets, eventually focusing on scientific research instrumentation. Their company is called Taboada Research Instruments, Inc. They have setup a manufacturing facility in San Antonio and continue to create new products and offer custom device fabrication services.

Case 4: Silicon Carbide Evolution (2003 I2P® UT Austin & I2P® International)[19]

In the Spring of 2003, two doctoral engineering students, Donnie Vanelli and Scott Evans began to examine a manufacturing technology capable of creating ceramic composite parts without using special fixtures or tooling. The original research that created the technology was directed toward the fabrication of semiconductor manufacturing fixtures. A State of Texas Technology Development and Transfer Grant had been awarded for additional research, but was in need of matching industry funds.

The students chose to work on the technology for a business plan course they were taking. Their coursework led to an entry into the I2P® competition. During their coursework and preparation for the competition they invented a new application for the technology: fabricating metal casting dies. Their presentation gained the interest of an angel investor (and serial entrepreneur) who was judging another round of the competition.

The investor and students established connections with strategic partners. The group formed a company (Advanced Laser Materials, LLC) during the summer of 2003, licensed the existing technology from the university and provided the matching funds necessary for further research to continue. One student became the lead researcher (and VP) while the other was president of the new venture. The students competed in both the Shirley Murphy Business Plan Competition (taking first place) and in the first I2P® International competition that Fall. After the company shifted from its initial product focus (as new companies often do) the student who was lead researcher decided to complete his degree (while retaining an advisory role in the company). The other student continues to serve as the president of the new company.

Case 5: InfoVision (2003 I2P® International, Georgia Tech and Emory University)[20]

Ph.D. student Katie Emery and her advisor Julie Jacko jointly invented a technology that helps a wide variety of visually impaired people operate a computer (or other GUI interface devices). The development was fostered by the Lab for Human Computer Interaction and Health Care Informatics in the Industrial and Systems Engineering Department at Georgia Tech. The technology commercialization side of the project was supported by Emery's admission to the TI:GER program, a two-year technology commercialization graduate program that places business, law and engineering students into teams and as well as including several multidisciplinary courses.

During the second semester of the TI:GER program a commercialization plan is prepared that contains several of the elements of the VCC. The preparation of a commercialization plan for the InfoVision technology facilitated an entry into the I2P® International Competition. She was joined by Tim Shippey and Adam Severt for that event and took third place.

The next phase of the TI:GER program is the creation of a business plan. She and her team competed in the Georgia Tech Business Plan Competition and another competition in San Diego.

Case 6: Microdynamol Upower (2005 I2P® UT Austin & I2P® International)

Tom Pate, a mechanical engineering student, invented a compact, human powered device capable of recharging many different types of portable electronics including cell phones, cameras

[19] For additional information about this project see: R. S. Evans, Doctoral Student Co-founders: A Case Study of Advanced Laser Materials, LLC, *Proceedings of the ASEE Annual Conference and Exposition*, Session 1454, (2006).

[20] For more details about the project see: L. Fleming, M. Thursby, J. Quinn, InfoVision(A): Technology transfer at Georgia Tech, *Harvard Business Online*, Feb. 14, 2005, (9-605-064).

and PDAs. His invention is capable of providing 20–60 minutes of talk time with one minute of cranking or operating a foot pedal. Before the competition the invention was a concept in drawings and notes of the technological concept.

Mr. Pate and his team prepared for the competition by examining the material and suggestions on the I2P® Web site including all of the videos of previous teams. They noticed that many teams were asked questions about how the technology worked and strove to make sure the presentation at least clearly communicated the technology. He and his team member, Moss Shimek (a doctoral student in mechanical engineering), attended workshops provided by TES on marketing, communications and IP. They also studied these topics on their own. For the competition, they prepared a presentation that focused on real customers. Their work for the competition took the technology from a possibility to the detailed design of a prototype focused on a specific and needy initial market.

They won the 2005 I2P® UT Austin Competition. They were approached by more than eight different companies that were interested in their technology. Several local entrepreneurs have continued to provide assistance and mentorship. Tom and his growing team joined the Austin Clean Energy Incubator[21]. Through the CEI they were connected with four MBAs who added marketing and business development expertise. They rapidly moved forward with IP development and the creation of their first complete prototype. Later in the year, Tom and Nick Bhavsar, a Texas MBA student, were awarded second place in the 2005 I2P® Global competition. Tom is continuing to work on his graduate studies and the development of his company.

Case 7: Concrete Canvas (2005 I2P® International, Imperial College, London)

Peter Brewin and William Crawford, both engineers and students at the Royal College of Art (studying industrial design and engineering), invented and patented a "building in a bag." After adding water to the bag (wetting a cement impregnated fabric), the bag is inflated to create a dome structure that hardens in about 12 hours. Doors or other access can be cut into the structure. The technology is a low-cost, semi-permanent structure deployed like a tent. Before the Idea to Product® competition the team had worked for nearly two years on the concept. Their work included building several eighth-scale prototypes and visiting Uganda (funded by the British Standards Institute Sustainable Design Award) for extensive primary market research. The pair won several awards and competitions and took second prize in the British Cement Association's Innovation Award competition[22]. The project has also received press coverage by the *Wired News*, *Time* magazine and the Discovery Channel[23]. Their victory in the Imperial College New Business Challenge in 2005, earned them the equivalent of $48,000 and a connection to the Idea to Product® International competition later in the year. They took second place.

Fig. 6. Building in a bag

After the competition they won the Saatchi & Saatchi Award for World Changing Ideas, further boosting their fund raising and publicity. They secured grant and angel funding to continue the development of their company. They set up a manufacturing facility that will allow them to build full scale prototypes and have worked to build the supply chain and manufacturing processes for their product. The next milestone for the team is a year-long deployment of a full-scale prototype.

Case 8: KlarAqua (2006 Nat'l I2P® Competition for EPICS & Social Entrepreneurship, Illinois Institute of Technology and Monterrey Tech)[24]

Teams of faculty and student researchers from Illinois Institute of Technology and Monterrey Tech in Mexico collaborated to create a water purification technology for the developing regions of Mexico. The central challenge for this project was creating an economically sustainable solution. Students and faculty at the Illinois Institute of Technology and Monterrey Tech in Mexico collaborated to invent a technology. They quickly recognized that their solution could not use electricity and should be clay-based to take advantage of materials and fabrication expertise that existed in the market. They created a new recipe for clay

[21] For information about the CEI see: www.cleanenergyincubator.com.

[22] For a complete list of the awards and competitions visit their website at http://www.concretecanvas.org.uk.

[23] For additional discussion about the project see: *Time* magazine: http://www.time.com/time/archive/preview/0,10987,1134762,00.html *Wired News*: http://www.wired.com/news/technology/0,66872-0.html The Discovery Channel (image credits): http://dsc.discovery.com/news/briefs/20050815/ concrete.html.

[24] For more information see: N. R. Khalili, M. J. Acevedo and E. O. Nadal, Design, characterization, and economic analysis of a low cost water purification system for Mexico, Fourth LACCEI International Latin American and Caribbean Conference for Engineering and Technology, June 21–23 2006, Mayagüez, Puerto Rico.

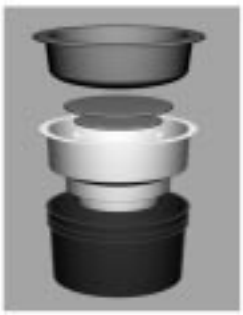

Fig. 7. KlarAqua.

pots and filter plates containing low-grade silver as a permanent anti-bacterial agent. Their market research included talking with churches and political leaders in various regions of Mexico. Teams of students focused on design, characterization and testing and business planning. In their case the connection to the market and the involvement of various students and faculty allowed the invention of technology to run parallel with the creation of a VCC.

Amanda Gilliam and Laura Grimmer presented the technology in the 2006 National I2P® Competition for EPICS and Social Entrepreneurship, taking first place. The team was invited to compete in the 2006 I2P® International Competition in November, 2006.

Case 9: NanoTaxi (2006 I2P® UT Austin, EOT Course)

Abiola Ajetunmobi (Mechanical Engineering), Luz Cristal Glangchai (Biomedical Engineering), Jakub Felkl (Physics), and Shreyas Rajasekhara (Material Science) met on the first day of the EOT class in January 2006. Other students contributed in the course but did not participate in the I2P® competition. Ms. Glangchai had co-invented a nano-scale drug delivery technology with her faculty advisor and wanted to examine the commercial potential of the technology. The technology includes innovative nano-devices that are small enough to pass through the wall of a cell and a low-cost method of producing them. The machines have chemical markers that allow them to penetrate only a certain, pre-determined type of cell. There is also a door in the devices that can be opened only by a certain enzyme found in a diseased cell, to release a therapeutic payload.

The team created a VCC based on chemotherapy for lung cancer and won the I2P® UT Austin Competition. They then prepared an executive summary for the Burton D. Morgan Entrepreneurial Competition hosted by Purdue University. The team was invited to represent UT in the I2P® International Competition in November, 2006.

CONCLUSION

There is an "innovation gap" in the technology commercialization process that exists between the creation of new knowledge (perhaps within university research) and the development of a business plan. In each of the nine cases presented a team of students began with real technology and created a value proposition (a VCC) for a defined customer and for potential investors that spanned this innovation gap. Each team, whether through the resources available at UT Austin or using similar support at other universities went through an iterative process to create their VCC. The teams also went beyond the I2P® Program.

The case studies indicate that students with different backgrounds and different goals for studying technology commercialization have made valuable contributions to the commercialization of university technology. In many of the cases presented, faculty and resources from the private sector were drawn together in support of the technology commercialization process. There were students representing law, business and a variety of technical fields on the teams. Some students were already entrepreneurs before participating in the I2P® Program. In other cases students arrived with an interest and became technology entrepreneurs. Others, such as Katie Emery, became better researchers.

The value of creating potential opportunities for technology commercialization is difficult to quantify. Ultimately, it is not about anything quantifiable. It is about solving societal problems. In the cases presented, students created value in additional research funding, participation in business plan competitions and certainly in the formation of new ventures, and were assets in the commercialization of university technology and in establishing a more entrepreneurial culture at their respective institutions.

The Idea to Product® Program has established the systematic creation of a VCC as a method for crossing the innovation gap. This same method provides guidance to students learning about technology commercialization. The I2P® integrates technology commercialization and education about technology commercialization into a program that supports the research and service missions of the university and promotes an entrepreneurial culture.

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