Pitt’s Commercialization Process

In general, “technology commercialization” and “technology transfer” describe the process of formally transforming your research into practical applications with commercial potential, seeking patent protection for those innovations, and then transferring them to industry via license agreements and sometimes new start-up companies. The process also includes extensive market research, competitive analysis, value proposition development, business plan development and other commercial considerations along the way.

This how-to article will take you, step by step, through that process so that you’ll understand where to begin, how to protect your ideas, how to position your innovation for commercial markets, and what to expect for your efforts. Success will depend substantially on your active participation in the process. However, the University’s Office of Technology Management (OTM) and Office of Enterprise Development (OED), will assist you all along the way, making the technology commercialization endeavor a team effort from beginning to end.

Where to Begin

Before entering the technology commercialization process at the University, consider the following fundamental definitions, particularly with regard to inventions, also called intellectual property, and inventors. It’s important to understand such legal definitions and the parameters within which the University must operate before you enter the process:

Is your idea an invention?
The U.S. Patent and Trademark Office defines an invention as “anything made by the hand of man that is a new, useful and non-obvious process, machine, manufacture or composition of matter, or any new and useful improvement thereof…”

New, or novel -- The invention, or intellectual property, must be new, or novel, in that it has to be different and distinguishable from anything that already is publicly known or available. The invention would not be considered novel if:

- the invention already had been patented, known or even used by others in this country, or patented or described in a printed publication in this or a foreign country before the new invention had been made;
• the invention already had been in public use, on sale, or published -- more than 1 year prior to the filing of a new patent application in the United States, and immediately in other countries;
• the invention had been invented earlier by another person who did not abandon, suppress or conceal it.

Useful – An invention must be considered useful, at least to the extent that it offers one specific use, which then must be stated in the patent application.

Non-obvious – Today, this has proven to be the most troublesome of the requirements, particularly due to recent court actions around the issue, as obviousness is subjective. In short, the invention cannot be an obvious or trivial extension of another existing invention, as determined by a person “with ordinary skill in the art at the time of the invention.”

Process – A process is a method of manipulating certain materials to produce a given result.

Machine – A machine is limited to a particular apparatus designed to accomplish a certain result by a distinctive (new, useful and non-obvious) means.

Article of manufacture – This simply is a product.

Composition of matter – This refers to chemical and metallurgical compositions and may include specific and unique combinations of ingredients or new compounds.

Discovery vs. invention – It’s important to note that you can’t apply for a patent on a new discovery. Discovering a phenomenon in nature, for instance, does not constitute an invention. Nor does simply identifying a new plant species or new biochemical pathway. If you develop a new innovation, however, around that phenomenon or new plant species, or create a new way to manipulate or leverage a biochemical pathway to solve a problem, that would qualify as being “made by the hand of man.” New methods for treating a disease, and the development of new computer software algorithm, likewise would constitute a new invention. In general, the laws of nature, theories, scientific principles, pure algorithms and plans of action don’t qualify as inventions and therefore cannot be patented.

Who is the inventor?

Inventorship is legally determined; an inventor, according to the U.S. Patent and Trademark Office, is anyone who conceives of the new ideas that actually are embodied in claims of a patent application. If a patent application, for instance, includes 10 claims, and you conceived of even one of those claims, you are considered an inventor of the entire invention, along with the other inventors. However, if that one claim is removed during the course of the patent reviewer’s evaluation of the invention, you no longer will be considered an inventor on that invention. In general, inventorship is based on your participation, contribution and value to the invention, as perceived by others. Keep in mind that inventorship does not work like authorship of scientific journal articles, which sometimes include all researchers who conducted the work.

Establishing inventorship

Once you determine that your idea is new, useful and non-obvious, establishing inventorship still requires two basic steps from a legal perspective, as determined by the U.S. Patent and Trademark Office. Both must occur for an idea to be considered, officially, an invention.
1. **Conception** — Conception is defined as a formulation by the inventor of the complete means of solving a problem in a way that allows a person of ordinary skill “in the art” of that particular field to recreate or use your invention without extensive new research or experimentation. By itself, though, conception isn’t considered an invention.

2. **Reduction to practice** — To complete the legal definition of invention, you have to follow through with step two -- taking your idea and reducing it to practice. In short, you must actually make your concept, test it and prove that it works. Take, for instance, those who have conceived of time machines over the years and theorized about how such machines might work. Many have achieved conception, indeed. But inventors have yet to reduce it to practice and prove that their machines could work. Thus, they have no invention.

   Reduction to practice can occur two ways: In an *actual* reduction to practice, you make the invention, test it, and then determine that it works for its intended purpose. In a *constructive* reduction to practice, you file a patent application that sufficiently describes the invention in a way that allows a person with a “skill in the art” to practice the invention. Sometimes, filing a patent application itself is considered the equivalent of a reduction to practice, but fields such as biotechnology require an inventor to demonstrate actual biological activity.

**The Invention Disclosure**

You’ve conducted your research and found that, along the way, you may have developed an invention, or innovation, with commercial potential. Now what? That’s where the OTM comes in. Before you publish your data, present it at a conference, or otherwise share your ideas with outside parties, submit an invention disclosure to the OTM for consideration. You can obtain an invention disclosure form and submit it online via this Web site.

An invention disclosure simply allows you to share enough detailed information about your innovation with the OTM to allow the OTM and an independent committee of Pitt administrators and faculty peers -- known as the Technology Transfer Committee -- to evaluate the commercial potential. It also is the first step in the process of seeking patent protection for your innovation.

Keep in mind that the University claims ownership and control of the worldwide patent rights that result from the research conducted by faculty, staff and students – particularly if the federal government has funded the work wholly or in part. The invention disclosure allows the University, then, to determine whether it wishes to retain such ownership and control to pursue commercialization, or whether to release the innovation back to the innovator.

Once the OTM receives your invention disclosure, the University is required to report your innovation within 60 days to the government agency that provided your research funding.

**When to submit: early…and often**

Indeed, you should submit an invention disclosure as early as possible once you’ve established that you have an innovation with commercial potential. While the invention disclosure itself offers no patent protection for your innovation, early submission will allow the OTM to act more quickly in filing a patent application to the U.S. Patent and Trademark Office. That could be important later, in the event that a similar invention is under development elsewhere.

Just as importantly, though, you need to submit an invention disclosure early if you’re preparing to reveal “enabling information” about your innovation in a scientific journal article or conference presentation. As
such, the invention disclosure will alert the OTM to expedite the filing of a patent application when appropriate to avoid any public disclosure of enabling information that hasn’t yet been patent-protected.

Please note that the OTM in no way wants to hinder your ability to publish your data or present your work in a timely fashion. On the contrary, the OTM tries to work in concert with your publishing efforts. But if you do reveal such information outside the University without filing a patent application first, you will seriously jeopardize the University’s ability to seek protection for your innovation, especially outside the United States.

**What to submit: Details, please…**

The information that you submit in your invention disclosure will determine whether the University is willing to invest in the commercial future of your innovation. So the more details that you can provide about both the technical and commercial merits of your idea, the better. After all, the commercialization process, including patenting, can prove rigorous, time-consuming and expensive for the University, and it offers no guarantee of success.

A well-written invention disclosure will provide the Technology Transfer Committee with the best possible opportunity to, first, understand the potential both technically and commercially, and then make a decision based on those merits. It also will help the University’s patent counsel to draft a more comprehensive patent strategy and application.

Include, in as much detail as possible, the following information:

- Working title for the innovation
- Name(s) and department(s) of all innovator(s) who have made creative contributions to the innovation.
- Dates of conception and reduction to practice
- How the innovation works and how it is used
- Description of the innovation, along with a comparison to other potentially similar technologies and practices. The comparison should note any improvements or advantages over known products or processes.
- Summary of the development status of the innovation, including data obtained so far to support and verify its functionality. Data should include a summary of any experiments conducted to date to support the functionality, as well as additional steps to take to further develop and test the innovation.
- A list of government and non-government funding support for the innovation’s development
- Potential commercial partners
- Detailed description of any known prior art and its disadvantages or shortcomings

**The Technology Transfer Committee**

When you submit your Invention Disclosure to the OTM for commercial consideration, it first goes before the University’s Technology Transfer Committee (TTC) for review. This peer-review committee, made up of University administrators and faculty peers, meets monthly to determine the commercial merits of the submitted Invention Disclosures and decide in which innovations the University should invest its limited time, money and other resources. In general, the committee historically has approved for commercialization an estimated 55 percent of all those innovations submitted to the OTM in given year.

The TTC typically considers three main criteria in determining commercial merit for an innovation:
Is your idea protectable? The committee first will assess whether your idea holds to the legal definition of invention, including whether it is new, useful and non-obvious. The U.S. Patent and Trademark Office won’t even consider your idea for patenting if it doesn’t meet that standard. And since most commercial partners won’t consider licensing your innovation without some kind of exclusive rights that come with patent or copyright protection, the University will pursue commercialization only when it can protect that exclusivity – and defend it when necessary in court.

Is the patent protection on your idea enforceable? While your idea might merit patent protection according to patenting standards, a patent holds little value if you can’t defend it against those who copy your idea, or infringe on your exclusive rights.

Is your innovation licensable? Having patent protection also doesn’t guarantee that your innovation will find success in the marketplace. You also must demonstrate that your innovation offers an attractive business opportunity and fulfills a need in the marketplace. Does your idea provide, for instance, a significant competitive advantage over existing products in that market space? Is it significantly faster, smaller, cheaper, or more accurate than existing products? Is the market large enough from a customer and revenue perspective to attract a potential commercial partner that would be willing to license the technology from the University?

Other considerations

- Level of intellectual property protection
- Related industry research and development activity
- Innovator participation in the commercialization process
- Development status and projected time to market
- Innovation validation and performance

In the end, the TTC will make one of four basic decisions with regard to your innovation as conveyed in your Invention Disclosure:

1. **Approve it** – If the TTC approves your innovation for commercialization, the OTM then will enlist outside help from specialized patent attorneys, in conjunction with your insights and assistance, and draft an initial patent application for submission to the U.S. Patent and Trademark Office.

2. **Hold it** – Often, innovators will submit invention disclosures on technologies that still are in the earliest stages of development, which means they might not have enough data yet to adequately validate and support the efficacy of the idea. If you find yourself in that situation, the TTC will ask you to spend more time developing your innovation, testing it and collecting data to support the case for commercialization.

3. **Release it back to you** – If the TTC determines that the University does not want to pursue the commercialization of your innovation, it will release your innovation back to you to commercialize on your own (after making sure that the relevant federal funding agencies don’t choose to take ownership of the innovation). If you do succeed on your own, the University requires only a small percentage of the proceeds that are generated.

4. **Not patentable** – In some cases, the TTC will determine that an innovation simply isn’t patentable. As such, the University won’t proceed with the commercialization process in those cases.

**Protecting Your Innovation**
Why file for patent protection on your innovation when you simply could publish your academic findings or present them to an industry conference audience? Many companies will not license an innovation or manufacture a product that does not offer them some kind of exclusivity – a monopoly, if you will. That means they sometimes won’t adopt your ideas without such protection, and your ideas therefore won’t ultimately reach the marketplace and help others. Patents and copyrights offer protected exclusivity, at least for a limited time.

A **patent** is a contract between the government and the innovator that provides the right to exclude others from making, using, selling, offering for sale the designated invention (or intellectual property) in the United States, or importing the invention into the United States. The contract extends for 20 years from the date on which the application for the patent was filed in the U.S., or, if the application contains a specific reference to an earlier filed application under certain sections of the patent law, from the date on which the earliest of such application was filed.

To achieve patent protection, you will have to convince the USPTO that your invention is novel, “non-obvious” and useful. A patent essentially provides the potential for a licensor to obtain a substantial and sustainable competitive advantage in the marketplace for a period of time.

The University of Pittsburgh owns and manages a sizable portfolio of patented and patent-pending intellectual **property**. As such, it reserves the right to sell or assign, pledge, mortgage, license or donate its property to existing companies outside the University, including new start-up companies that are established around the innovations.

The OTM manages the patenting process for all innovations developed by Pitt faculty, staff and students. If the Technology Transfer Committee, upon its review of your disclosure, approves it for commercialization, the OTM typically will move quickly into action and engage a qualified patent attorney to draft an initial patent application – usually a **provisional** patent application.

This type of filing with the USPTO serves to establish a filing date and provide protection for a 12-month period while a full patent application is being prepared for submission. No claims, however, are required in a provisional patent application (although business considerations may dictate the inclusion of a few claims). Therefore, a provisional application usually can be filed quickly and more inexpensively than a non-provisional patent application. Moreover, the USPTO does not review provisional applications.

The filing date is important particularly outside the United States because, if two inventors apply for patents on the same or similar invention, the first one to file will receive the patent. In the United States, however, inventorship is awarded to the **first one to invent**. And that often comes down to how well you have documented your development efforts in properly kept lab notebooks. That is expected to change, however, over the next couple of years, thanks to a recently enacted patent reform law.

Before the end of that 12-month period, the University will re-evaluate your data and determine whether to convert to a full non-provisional application, based on the functionality and perceived market potential of your innovation. It also will have to simultaneously complete any international filings.

**Copyrights…and wrongs**

Not all Pitt innovations that make their way successfully into the marketplace are patentable inventions. In fact, some of the University’s most successful commercialization efforts in recent years have revolved around specialized editorial content developed by Pitt faculty and staff and
formatted into books and papers, CDs, DVDs, databases, etc. While not patentable, such works still are protectable via copyrights.

**Copyrights protect your original works of authorship. They prevent others from being able to reproduce your work or prepare derivative works based on your work – without your permission. Copyrights also prevent others from distributing your work without your permission.** The good news is that your work becomes copyrighted automatically once your original work is affixed in a tangible medium, such as an article, book, CD, or PowerPoint presentation, for instance. To remind others, simply affix a copyright symbol ©, along with the year in which you produced your work, and the name of the entity that owns your work, to your actual work (© 2012 University of Pittsburgh, for instance).

What can you copyright? Consider the following:

- books, periodicals and manuscripts
- computer programs
- stage plays and screenplays
- music and motion pictures
- fine art, graphic art, photographs, prints and art reproductions
- maps, globes, charts
- technical drawings, diagrams and models

You can’t, however, copyright ideas, titles, names, short phrases or works consisting entirely of information that is common property and containing no original authorship (standard calendars, tape measures and rulers, etc.).

**To register your copyright…or not**

While your work does become copyrighted by virtue of putting it into a fixed medium, you still might consider registering your work with the Library of Congress. It’s not required, but it will prove beneficial because:

- It establishes a public record of your copyright claim;
- it’s necessary for filing an infringement suit against someone who violates your copyright;
- it establishes *prima facie* evidence of validity if made within 5 years of publication;
- and it allows statutory damages if you register your work within 3 months of publication or prior to infringement.

**Your scholarly works: caveats**

If you produced your copyrighted work in the course of your University employment or under the supervision and control of the University as “works made for hire,” your copyrighted interest in your works belongs to the University. However, you are entitled to claim copyright ownership, including world-wide rights, in the following works that are created as part of your scholarly pursuit: books; articles; educational coursework; similar works that are intended to
disseminate the results of your academic research or scholarly study; popular fiction or nonfiction works; poems and musical compositions; and other works of artistic imagination.

**Taking Your Innovation to Market**

Getting a patent for your innovation is a major accomplishment; but it’s only the beginning of the process. Actually, finding a potential licensee for your innovation and getting it to market requires a whole new set of challenges that often run contrary to the academic research mindset. This is where the University’s Office of Technology Management (OTM) and Office of Enterprise Development, Health Sciences (OED) – in active partnership with you – will step in and facilitate the effort on your behalf.

In short, the OTM and OED will provide: business planning and strategy; market research; targeted innovation marketing; start-up development; industry/investor relationship development; and financial resources to facilitate proof-of-concept and prototype development, data collection and other early-stage business development assistance. Past experience in technology commercialization strongly suggests, though, that a large majority of licensing successes begin with the active participation of the innovators – and their industry contacts.

**Why should they care?**

Assuming your innovation works, your biggest challenge won’t be convince industry how innovative your technology is, but rather why it’s exponentially better, cheaper, faster, or smaller than existing solutions to the problem you’re solving. And it must solve a significant problem that offers a huge business opportunity to a potential licensee in the long term. Otherwise, why should they care?

To answer that fundamental business question, you and your commercialization team at the OTM and OED will have to conduct some extensive market research to understand who the industry players are, how they’re solving the problem currently, where their business pain points exist, what your innovation’s competitive advantage may be, how large the potential market may be, what kinds of competition already occupy that market space, and what kinds of regulatory, insurance and other hurdles may stand in the way of commercial success, among other questions. Other questions to consider:

- Is your competitive advantage sustainable? Is there strong and broad patent protection, or a “first-to-market” advantage that will allow the technology to dominate the market?
- What level of investment will be required for your innovation to be fully developed and ready for commercialization? And will those dollars be made available for that development effort?
- What skills and resources are available to you, and will they be cooperative in allowing you to further develop your innovation?
- Will the potential end-users of your innovation be willing to pay a sufficient enough price to allow for an appropriate return on investment for the licensee of your innovation?

The OTM and OED do employ Pitt student interns, primarily from the University’s graduate and undergraduate business programs and law school, as well and experienced business consultants to assist with such market research and develop business opportunity development strategies aimed at significantly improving the commercial potential of Pitt innovations.

As you’re thinking about those market research questions, potential industry partners will be raising their own questions about your innovation as they decide whether to enter into a licensing agreement with the University. Among their concerns:
• How much time, effort and money will it take to get your innovation to market?
• What are the risks and pitfalls of your innovation?
• Would your innovation complement the industry partner’s other product offerings or research and
development programs?
• How will they convince their superiors and R&D colleagues that your innovation is a great business
opportunity?
• Can they get around your innovation without having to enter into a licensing agreement?
• Will you work with them to help develop your innovation? Often, companies can provide more
development than research in the R&D spectrum and must rely on academic innovators to undertake
any additional research that is necessary for effective commercialization, as well as trouble-shoot
when development problems arise.

The value proposition

Collectively, the answers to all of those market-driven questions should be reduced to a succinct, targeted
statement that sums up the commercial value of your innovation and convinces potential industry partners
to license your innovation. We call that statement – which will become your key marketing tool -- the
value proposition.
You then will use the value proposition to position the business opportunity for your innovation online, in
scientific journals, at conferences and technology showcases, industry partnering meetings, and other
interactive venues. The OTM and OED will help you develop that proposition and can cultivate numerous
marketing opportunities on your behalf. Here’s how they can help you:

• Develop marketing “slicks” that discuss your technology and its value proposition, as well as convey
who you are, your research interests, and scientific expertise. The slicks can be distributed to potential
industry partners at partnering events throughout the year.
• Post available technologies on the OTM Web site and other online resources that market university
technologies.
• Attend industry conferences and participate actively in those conferences’ partnering forums that
foster interactions among potential industry partners and licensees.
• Host technology showcases for potential industry partners, investors and other resources, which allow
you to display posters of your innovations. The OTM and OED also often will provide industry or
business-assistance mentors to help you strengthen your value proposition in such posters.
• Sponsor interactive events locally and nationally that give Pitt innovators the opportunity to meet
potential industry partners and investors.

In the meantime, you are encouraged to play an active role in that marketing effort as well. That’s why
the OTM and OED will work closely with you to help you develop your value proposition into a very
concise and simply worded description of your innovation and the business opportunity that it provides.
Some people refer to such a description as an elevator pitch.

As the name suggests, the premise is simple: You get into an elevator with someone whom, it turns out,
could be a valuable industry partner or investor. Now you have no more than one minute to capture that
person’s interest in your innovation and your value proposition, along with what you need to succeed. the
pitch should somehow include:

• a brief description of your innovation (non-confidential and in layman’s terms)
• the problem that your innovation solves;
• its market potential;
• a comparison to existing solutions;
• an explanation of the development stage of your innovation;
• and the status of any intellectual property protection you have received to date.

Licensing Your Innovation to Industry

The ultimate goal of the University’s technology commercialization endeavor, of course, is to find an industry partner or start-up company willing to license your innovations and take them to market. Keep in mind that the University does not sell its intellectual property. Rather, it negotiates a licensing agreement that gives the industry partner, or licensee, the right to use and/or sell your innovation in the marketplace.

The OTM, led by its licensing managers and supported by the University’s Office of the General Counsel and the Office of Research, will work closely with you not only to identify potential licensees, but also to negotiate all financial, business and legal terms on your behalf.

Typically, the OTM will negotiate one of two types of deals. If the potential partner wants an opportunity to explore applications and opportunities for a given innovation, the OTM will negotiate an option agreement. This gives the partner an opportunity to “kick the tires” and take some time to determine whether it should consider taking a license to the innovation.

Licenses likewise can take several forms. An innovation, for instance, might offer numerous possible applications, and a licensee might choose to pay for the exclusive right to all of those applications. Or it may be interested only in one specific application and therefore license that one only. In some cases, licensees will sign non-exclusive agreements for use of your innovation.

A typical licensing negotiation will proceed in the following manner:

1. It begins with an exchange of non-confidential information to launch more in-depth discussions.
2. Then they exchange more-detailed confidential information following the execution of a confidentiality agreement with the potential partner.
3. Soon, the partner will request a visit with the innovator. Potential licensees typically are interested in engaging in discussions with you about the science behind your innovation, available supporting data, development plans, and potential applications.
4. Serious contenders then will launch a formal due-diligence investigation. Often, the partner at this stage will conduct a formal review of the business assumptions that are critical to determining the commercial value and potential of the innovation. In some cases, the partner will enter into an option agreement at this stage to ensure exclusivity as it conducts that formal review.
5. If the partner is satisfied with its due diligence effort, the two parties then will enter into a negotiation of licensing terms, which will be detailed in a term sheet.

Terms of the deal

The OTM works with a diversity of innovations and at different stages of development, so each licensing deal tends to be different. However, the OTM’s licensing managers do typically include the following terms in the deals they negotiate:

• Patent cost reimbursement, past and new
• Up-front fees
• Royalties on sales
• Minimum royalties/maintenance fees (fees to maintain the license agreement in effect prior to actual product sales and provide an incentive to the licensee to pursue product commercialization aggressively)
• **Milestone payments**, including performance milestones, designed to share in the increased value of the innovation prior to product sales and royalty payments and to keep the commercialization process moving forward

• **Scope**, which documents whether the licensee will receive worldwide exclusive rights or rights to certain geographic regions, all fields of use or just certain applications

• **Equity** (the University can take partial company ownership, particularly in a start-up company based on a Pitt innovation, in lieu of cash payments)

**Your share of the proceeds**

Indeed, you and your academic department will share in the success of your innovation commercialization efforts, after expenses are paid. For patented innovations, the royalty distribution is as follows:

- You, the innovator, will receive **30 percent** of the proceeds (divided up among all of the innovators connected to the licensed innovation).
- Your academic department will receive **15 percent**.
- Then **10 percent** is applied to a University Development Fund.
- Another **30 percent** is placed in a Patent Rights Fund.
- The Office of Technology Management receives the remaining **15 percent**.

For copyrighted innovations, the royalty distribution is as follows:

- You, the innovator, receive **50 percent** of the proceeds.
- Your academic department receives **25 percent**.
- The remaining **25 percent** is applied to a Copyright Development Fund.