

The Ask:

Universities should create pathways for innovators to commercialize technologies in an open way (without using intellectual property) and provide institutional support for those efforts in the same way they do for traditional commercialization. (more)

Supporting Arguments:

Greater Impact

Projects commercialized in an open way can result in greater overall scientific impact and more research opportunities within the university, lead to increased grant revenues, convert a larger % of research outcomes into real-world products, and result in greater name recognition and prestige for the university. (more)

Natural outcome of technological change

Open innovation is the natural (and inevitable) outcome of our increasingly connected world. (more)

The rights of the researcher and funder

It is the obligation of the university to provide innovators with an ethical route for sharing and/or commercializing their ideas and to not restrict access to information from those providing the funding (ie taxpayers for public institutions). (more)

Current examples of open commercialization:

Sensorica.ca, Photosynq.org,

Historical examples of open commercialization:

WWW from CERN, human genome project,

The Ask (more)

Background

Current university policies directs research towards commercialization paths using traditional intellectual property – patents, licenses, and other 'closed' models. Most universities have a Technology Transfer Department which is responsible for commercializing technology generated within the university. TT identifies patent-worthy technologies, secures the intellectual property, and identifies companies which are interested in licensing said technologies.

The Tech Transfer department is, however, a relatively new phenomenon initiated by the Bay-DohI act in 1980. Prior to Bay-DohI, all federally funded research remained the property of the federal government. However, the government only actually licensed or used 5% of that work. Bay-DohI allowed non-profits, for-profits, and universities to elect to keep control of the intellectual property from federal research (with a few caveats). **The goal of the 1980 Bay-DohI act was for universities, non-profits, and for-profits to be more effective at commercializing federally funded research than the federal government.**

Though the original focus of Bay-DohI was to increase the percentage of federally funded research which saw the light of day, **the de-facto motivation for universities is to use technology licensing as an income stream, especially as federal and state research and education dollars have dried up.**

An argument could be made that more intellectual property is being used today than prior to 1980. **In 1999, 32% of disclosures (patents) resulted in licenses (ie were picked up by a company) as compared to only 5% prior to 1980.** While this is a large improvement, 70% of research remains shelved for a wide variety of reasons: the product market is too small to justify the patent/licensing costs, the patent is too hard to defend (consider software which is easy to copy, for example), the technology is still to early stage and is unclear if a commercial product could result, etc.

Traditional commercialization using the patent-profit-protect model is therefore not sufficient to achieve the greatest impact for taxpayer dollars. **New models of commercialization based open access to designs, information, and data with a focus on collaborative development are the next step for universities for three key reasons: greater impact, the inevitability of openness, and the rights of the researcher and the funder.**

Questions for Charlie:

So, for every 100 patent ideas that come across your desk, only 30% are converted to patents... of that, how many are actually licensed? Of those licensed, how much data do you have about the resulting impact on their respective markets?

Do you have data on the 30% which are actually converted to patents?

http://www.cherrycommission.org/docs/Resources/Economic_Benefits/2nd.Annual.medc_tech-transfer.assessment.pdf

was goal of these policies for the university is to generate income, though the Bay-DohI act which created and secondarily to transition research to real-world products.

opportunity:

Open data is in line with the direction the federal government is going

Technology commercialization has had a long and complex history.

- 1) in both academia**
- 2) and industry**

Many key stakeholders in commercialization, specifically the innovators and the inventors, are unhappy with where we've ended up.

- 1) Individual level concerns**
- 2) Societal level concerns**

Intellectual property (patents, copyrights, etc.) lies at the heart of all of these concerns.

Technology and globalization means. Eliminating intellectual property from commercialization has many benefits

Technology and globalization have made many new commercialization paths possible which do not use intellectual property

- 1) The cost of copying many products are now zero (software, 3D models to print, etc.)**

academicians are primarily interested in impact

Sorry - when I initially shared this I had forgot to turn on editing - it should be on now!

This is an outline of a presentation to be made to Michigan State University to promote their active support (with funding, marketing, and other resources) for open commercialization of technology developed within the university, with a focus on physical products (equipment, platforms, etc.). **Feel free to take it, share it and adjust it.** If you make a new version, please save it in the folder "Open Commercialization Pitches".

Please help me improve the outline, add examples, links, and stories. It's OK if this outline is long - we can trim it down for whatever length presentation is being given.

many good examples: <http://opensciencesummit.com/speakers/>

Great infographic I'd like to add an "open commercialization" track to:

http://www.autm.net/AM/Template.cfm?Section=Free_Agency&Template=/CM/ContentDisplay.cfm&ContentID=10464

NOTES TO SORT:

http://p2pfoundation.net/Open_Source_Commercialization

<http://fpvlab.com/forums/showthread.php?14813-A-Note-Regarding-the-Commercialization-of-Open-Source-Products>

all of this and more from:

* <https://www.diigo.com/user/mbauwens/Open-Source-Commercialization>

and

* <https://delicious.com/mbauwens/Open-Source-Commercialization>

perhaps worth checking out:

http://www.eurekalert.org/pub_releases/2013-04/vtrc-opa040513.php

http://www.kicad-pcb.org/download/attachments/589828/kicad_code.png?version=3&modificationDate=1334524710000&api=v2

Human genome projects - impact and ROI

-http://battelle.org/docs/default-document-library/economic_impact_of_the_human_genome_project.pdf

Outline of the problem:

Current day commercialization has not kept up with needs the user, the developer, and the funder:

- **Users** want the ability to change, modify, hack, or fix the items they buy and increasingly have the skills, tools, and spaces to do so.
 - Rise of the maker movement, backlash against DRM and restrictions on using

audio, video, etc., OTHER EXAMPLES!!! For the non-techies to whom you are presenting, it might be helpful to set forth a historic example: we used to buy a TV/car and take it apart and fix it ourselves. Now those devices are increasingly walled-off?

- The Model-T Ford
 - http://media.ford.com/article_display.cfm?article_id=7243
 - The Piquette Plant (the Birthplace of the Model T)
<http://www.tplex.org/index.asp> has several examples of “moded” Model Ts. A snow cat with tracks for wheels for example.
- HeathKit - http://en.wikipedia.org/wiki/Heath_kit
- **Developers** want to maximize the impact of their work in the world, receive credit for that impact, have the money to continue to innovate and invent, and (in some cases) earn a living from the process.
 - EXAMPLES FROM THE LITERATURE/MEDIA ABOUT DEVELOPER PREFERENCES/MOTIVATIONS?
- Perhaps think about the mission of public/state universities to improve the life of citizens in the states that fund them? Ex: [U-M mission](#) to “serve the people of Michigan and the world...”
[MSU](#) states, “our mission is to advance knowledge and transform lives by ... conducting research of the highest caliber that seeks to answer questions and create solutions in order to expand human understanding and make a positive difference, both locally and globally”
 - Is there anything of any use in “[The Cathedral and the Bazaar](#)”? I believe there was some discussion about the motives of developers that contribute to open source projects.
-
- **Large scale funders** (venture capital, investment firms, etc.) want to maximize their return on investment and are the primary beneficiaries of traditional commercialization
- Think about other funders to university projects: government agencies, private foundations, etc. They want to see their investment dollars bring the biggest possible impact (you want to think beyond private funders)
- **HOWEVER, individual funders** are much more flexible in what they see as a return, especially with small sums. They want some combination of cash, useful products/services, value to society, value to some cause that is meaningful to them, etc. Individual’s attempts to push these preferences up the chain to institutional investors has been only partly successful.
 - Good examples: Kickstarter, This American Life, NPR... other things somewhere between donation and paying for a service/product
 - EXAMPLES FROM THE LITERATURE?

Commercialization assumes that bringing a product to market requires a large upfront investment with a traditional large scale investor, who then requires a significant reward for

taking that risk. Intellectual property ensures that reward by guaranteeing a market advantage over competitors. However, intellectual property **can** stifle the needs of the consumer and (counterintuitively) often reduces the control of the developer over their product **Explain this some more.... how does holding control limit control?**, while having a variety of negative secondary effects in the market like:

- Patent trolls -
- <http://www.thisamericanlife.org/radio-archives/episode/496/when-patents-attack-part-two>
 - <http://arstechnica.com/tech-policy/2013/05/newegg-nukes-corporate-troll-alcatel-i-n-third-patent-appeal-win-this-year/>
 - http://www.ted.com/talks/lang/en/drew_curtis_how_i_beat_a_patent_troll.html

the logic behind the patent troll:

They systematically sent thousands of letters out saying, "Hey, we own 27,000 patents, and here are some patents we think you infringe." They had a whole licensing group whose job was to monetize these patents, by threatening litigation and in some cases litigating. It didn't actually matter if you did your own analysis and got back to them and said, "Hey guys, we actually think we don't infringe." The response was something to the effect of, well, we have 27,000 patents—and you probably infringe something, so give us a licensing fee.

Patent trolls, are simply engaged in an effort to abuse the legal system to extract payments

- This article questions the reasons for traditional commercialization, and the drive towards putting technology directly in the hands of business from universities.
 - <http://www.eastbayexpress.com/oakland/public-research-for-private-gain/Content?oid=3619535>

The alternative:

Open commercialization intends to bring value (products, stories, platforms, etc.) to market without using intellectual property while actively sharing the product's design, concept, and methods.

- Provides consumers with the right to modify, change, or fix their products and engaging them to take part in the development
- The developer gives up direct control over their invention to the public, however, they also prevent a single individual or group from having restrictive control.
- Allows a smoother, less expensive, bootstrap-based path to market allowing the developer more control over the process
 - Eliminates intellectual property (**maybe think of how to say this in a less “final” way? Intellectual property is a highly-regarded value in academia -- could it be rephrased by saying SHARING of intellectual property?**), allowing information to flow freely, and reducing upfront costs of commerce
 - Because the information is freely available, finding and modifying a product for a new market can be done by the users themselves which saves the developer money and time. **EXAMPLES!!! Arduino. People can modify the plans but Arduino still holds onto the ability to manufacture products themselves. Their**

factory employs many local citizens to manufacture. Want an original Arduino? Buy from them. Want to hack your own? That is OK, too. (Oops - now I see below that you discuss Arduino already)

- Product improvements can come from the user community, meaning less upfront development cost for development EXAMPLES!!! Maybe Chris Anderson's DIY Drones project?

Case Studies:

- AVR and Arduino (AVR not open source, had limited market. Arduino is effectively the same, but completely open source and exploded).
- Wikipedia - open, hugely popular and useful. Encarta - proprietary by Microsoft, petered out.
- Kitware has been developing BSD-licensed open source frameworks for use in many areas of science and related areas for over 15 years, promoting shared ownership of the projects and the code by making it available to all under the same terms. Examples include VTK, ParaView, ITK, CMake, and many newer projects. These are developed collaboratively, and have opened up new markets to the company, which is privately owned and has been profitable since creation.
- MSU grad students who are unable to graduate as a result of waiting for patents, delays and publishing..
- MIT licensing of MIT technology
- Not sure if this is the right section but consider examples of things that aren't TOTALLY open. They are interesting because it gives some idea of the thoughts going into a company relinquishing some of its control over a product. Examples include:
 - Apple App Store. Apple has huge ownership over most of the project but they allow free(ish) development of apps in the marketplace by third parties, don't own them or monetise from them directly. This is a huge development from a world where companies delivered and controlled the entire software package and people had to pay huge sums for upgrades. Now Apple reaps the benefits of being in control of the ecosystem without having to take on all the creative work.
 - Microsoft Office Suite. Consider what would have happened if the inventor of the spreadsheet concept actually wanted to reap royalties every time someone used a spreadsheet. Same goes for a slide deck. Microsoft was able to monetise without having control on that minute a level. People pay royalties for the entire software package but not for the concept of the tool itself. This has allowed Office Suite users to create many many documents without too much worry over who controls their work.
 - Google Drive. Unlike with Office Suite the word processing and spreadsheet technology is completely free. Users aren't paying royalties to use it but instead Google gets the benefit of being able to capture them in the Google world and then perhaps sell some ad revenue from the sustained attention.
 - Anything with an API. API's allow applications to talk to share data. Products that have an API allow users or partners to come in and create tools that can help

customise the original product. Not the same as changing the original product but depending on how extensive the API is can allow for some really great customizations.

- [StackExchange](#) network (this one from [StackOverflow](#)) - system is proprietary, but [all user-created data is CC BY SA](#) and made easy accessible via [apis and public database dumps](#).
- A very common model where a technology is open-source, but the money is made on consulting, examples (random, not necessarily the best):
 - <http://www.mongodb.org/>
- Where the main engine or company-created content is open:
 - <https://www.khanacademy.org/> (code here: <https://github.com/Khan>)
- World Wide Web from CERN - <http://home.web.cern.ch/about/birth-web>
- ... OTHERS??
- Village Telco - mobile phone mesh networks for the developing world, built on open source protocols.

Hurdles:

Open commercialization efforts must address the following issues to be successful:

- Reduce trade secrets as a solution for market competition while incentivizing collaboration
 - Good example: PJRC sells a completely open source piece of hardware called the Teensy. Because he has built such an amazing support system (forum, help, examples, libraries) on his website, consumers are dramatically less likely to purchase a Teensy knock-off from China - both because they are already at his site and the “buy” button is so close, and because they truly appreciate the value that PJRC brings to the market (personal trust).
 - Chinese knock off is actually more expensive
 - OTHER EXAMPLES!!! Agree that you need them ... but am a bit stumped. Also suggest that you look at other sectors beyond maker-y or DIY. Can you find anything about open-source in health care? Education? Public works? etc. You want to have the widest variety as possible -- you don't want too much weight to be on the Kickstarter end of things because if someone just doesn't like DIYish stuff, they'll discount your whole argument.
- Ensure a good system of crediting innovators and those who add value to the process
 - Sensorica.co has created an internal system of credit for distributing value to those who helped create a product.
 - The internet itself acts almost as a time-stamp for projects. Once something is on the web, it's hard to argue who came up with something first!
 - OTHER EXAMPLES!!!
- Train the market to recognize success by supporting it, both by buying products and by investing in it.

- NPR and affiliated shows (this american life, radiolab, etc.) have done an amazing job at this. Kickstarter has had similar effects.
- Public expectation that publicly funded research will be publicly available
- OTHER EXAMPLES!!!

Maybe you can look at how government-funded projects now require that articles (one form of intellectual property) written about them be in open-access journals to maximize reach?

Why is open commercialization possible now?

- Enabling Communities:
 - Maker spaces, Hacker spaces, open science labs
 - Crowd-funding sites
 - Wikipedia and open access to learning resources
 - Lessons and models from 15+ years of open source software and also from years of funded projects that go dormant once funding to academia for them expires. A lot of good stuff gets abandoned ... and could be, instead, built on by another group of “amateurs” or “experts”
- Enabling Technologies:
 - Simplify collaborative development
 - Gitorious/Github, opendesignengine.net, google docs/Etherpad, etc.
 - Dramatic decrease in cost of electronics
 - LEDs, arduino, raspberry pi, etc.
 - Low cost prototyping tools
 - 3D printers, rep rap, laser cutters, etc.
 - Professional quality free software
 - Blender, Libre Office, Simple CV, free accounting tools, etc.
- Innovators are simply opting out
 - Arduino, Limor Freid, PJRC, etc.

How do Universities fit in?

The core tenets of universities, especially publicly funded ones, are more consistent with open commercialization. The perceived problem is that Universities will lose money if they do not commercialize products using the traditional process.

- Open Commercialization can also generate revenue streams for the university (for many universities this is going to be the only relevant argument :()
 - Let's assume that patenting a technology costs 40k for a typical university. An open technology would save that 40k IN ADDITION to any further fees required to maintain the license, enforce licenses, enforce the patent
 - EXAMPLES

- Actual data about how much money is made through traditional commercialization at Universities
 - Here's the data for Michigan public universities (MSU, UofM, Wayne State, etc.) http://www.cherrycommission.org/docs/Resources/Economic_Benefits/2nd.Annual.medc_tech-transfer.assessment.pdf
 - Michigan State received 25 million in patent revenues in yr 2000 (most recent data I could find), of which one drug carboplatin was likely a majority of that value.
 - EXAMPLES
- What are other benefits of open commercialization?
 - Technology which previously fell through the cracks because it was not a good fit for traditional commercialization will see the light of day.
 - Open data is an increasingly important component to access grants and further funding
 - Sets the university up as an innovator and leader
 - More consistent with the basic tenets of a university (especially for public and land grant universities) *May have jumped the gun when I inserted similar ideas earlier, but I think that if you can appeal to the fundamental mission of a state university, that's the most powerful argument of all, so don't bury it!*
 - MORE!!!
- What is the cost of traditional versus open commercialization for a similar project?
 - EXAMPLES AND DATA!!!
- What are the skills, tools, and resources needed to commercialize a product in an open way?
 - Marketing (social networking)
 - Access to a large community who is interested in engaging the problem and The ability to build and maintain a community
 - Tools, space, and resources for development
 - Access to a wide-ranging skills
- What are some examples of existing projects from universities which were commercialized in an open way?
 - EXAMPLES!!! *Is MaKey MaKey an example?????*

How could a university take part?

- Change the basic agreements with professors to enable them to choose to commercialize in an open way, *either immediately or after a prescribed period of time*
- Provide support through tech transfer or another department for their commercialization efforts
- Examples of universities taking organized actions to support open commercialization
 - EXAMPLES!!!
- MORE??? WHAT ELSE?

Common arguments by tech transfer folks against open commercialization

- The current system has been around for a long time, has lots of examples, and is well understood by Universities and supported by the government (Bay DohI, STTR/SBIR, etc. etc.). This is a risky strategy that could not only result in less impact but could lose revenue for universities.
 - **Loss of Revenue:**
 - 2009 study which suggests that tech transfer over half the times loses more than it makes, and only 14% are net revenue generators after payments to inventors.
<http://www.bu.edu/itec/files/2010/09/Abrams-Leung-and-Stevens.pdf>
 - **Other successful examples:**
 -
- Provide support through tech transfer or another department for their commercialization efforts

Contacted Lita Nelson from the Tech Transfer Dept at MIT.
What structures do they have to support open commercialization?

Basically, if MIT can't generate income from it it's up to the professor to go figure it out. They have a entrepreneurial ecosystem here (such as "MIT entrepreneurial eco-system", such as the Venture Mentoring Service, the 100K business plan contest, the Martin Trust accelerator program (if eligible), the MIT Enterprise Forum, etc.), which may provide some support for projects which are not traditionally licensed, but there's no other formal structure to aid those projects to success.

Dear Mr. Austic:

I am the director of MIT's Technology Licensing Office, and this message was forwarded to me from the MIT Media Lab.

Many companies are started by faculty and/or students without intellectual property belonging to MIT. Some of the founders simply act on their own, with no involvement with MIT. Others may take advantage of various components of the "MIT entrepreneurial eco-system", such as the Venture Mentoring Service, the 100K business plan contest, the Martin Trust accelerator program (if eligible), the MIT Enterprise Forum, etc. These components and others are described in our brochure "Inventor's Guide to Startups" on our webpage: tlo.mit.edu (the Deshpande Center, also described in the brochure, however, only gives grants to projects with MIT-owned patents.)

MIT does not receive any equity or royalties from the non-licensed companies that participate in the activities—which are given gratis.

Hope this is helpful.

Regards,

Lita Nelsen

See below

Sent from my iPad

On Jun 29, 2013, at 4:30 PM, "Greg Austic" <gbathree@msu.edu> wrote:

Definitely helpful - thanks!

But do you have any formalized structure within the university for commercializing inventions without using patents/copyrights?

Nothing formalized if there's no IP. Some "formalization" in how we help students, but nothing back to MIT.

Do inventors have decision-making power or influence over the commercialization path? If no IP, then no "inventors". If it's not "IP-protected" technology, then anyone can commercialize it--but presumably, the investigators/authors are the most likely to do so. MIT as an institution has no route to commercializing the results of our research except through licensing (including, very occasionally, a piece of "tangible property" such as mice or cell lines; but that's trivial)

What we're discussing here is adding an "open" pathway as a commercialization option within tech transfer, such that if a technology emerges which isn't a worthwhile investment for the U to patent (too expensive, market's too small, hard to enforce, etc.), the office then applies a non-IP "open" model for commercialization using crowd-sourced funding, collaborative / community-based development, etc.

Again, our open model is simply publication plus non-remunerated support of entrepreneurs through the components of our entrepreneurial eco-system described earlier.