

Why Tech Doesn't Transfer All That Well and How It Can

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Universities used to be relatively straightforward in their mission: The ideal was that the top research universities were strategic investments in communities of thought leaders and blue-sky scientific inquiry. Within this context the researchers, students, teachers and companies that formed the body of the institution could provide facilitation through which research became technology, technology became products, and we eventually all profited from world made better and new from this stream of innovations. The mission of these universities was to create and distribute new ideas. Commercial exploitation was not an important part of the landscape.

The ideal has changed radically over the last few years. The new university is vertically integrated: Greenhouse, incubator, and venture capitalist all rolled into one. It also has an acquisition agenda to rival Pfizer's. The new university has become the ultimate active investor with good reason: Decreases in government funding, rising costs of research, and increasing difficulties in keeping top talent that could easily go to industry. , and. The new university has been forced downstream to where good ideas become good business. It has been forced to look at how to make the most of what it has and like so many corporates has had to pose the question "how do we make our assets work better?" In posing this question it has become clear that the laissez faire attitude to technology transfer that existed in many institutions was losing opportunities. Big ideas and big opportunities have sought support outside their university birthing grounds and so value has been lost. At times the value is captured by entrepreneurs, venture capitalists and corporates and so the university is the only big loser. Many times the value may not be captured at all and so we are all losers.

Thoughtful focus on this area has in turn forced academic institutions to think like corporates and question the role of funder and facilitator. The role of the conglomerate, aggregator, and middle-man is not unique to universities. Federal, state, and local government has invested heavily in a labyrinth of economic smart zones, business accelerators, strategic investment funds and overlapping offices of technology transfer. They have created their own relationships with universities to mine these intellectual assets. They have their own needs: Technology that creates businesses, jobs, taxes, and revenues that will sustain this dizzying myriad of institutions. There are all sorts of structures here; what seems to be missing is the momentum.

So who owns the ideas: University offices of tech transfer, the researcher / inventor, governments, corporate R&D centers, or venture capitalists? If the answer is no one, no one makes money. If the answer is everyone, no one makes money. An economic imperative is the very foundation of the tech transfer business model for it assumes that it produces something worth paying for. It's an investment that will pay superior dividends to whichever of these entities can best leverage innovative ideas and research into applications and ventures of tangible value. It is a collaborative model on the surface, but the redundant role of these conglomerates provides ample opportunities for disintermediation. Playing in the free market means that power, money, and influence

will be used to set the rules that ultimately determine who gets what. For example, the government makes the rules for grants and funding and the university incorporates these rules into its resource allocation processes. Right now it looks like the potential to create a powerful position is there but there is nobody filling it. The person who accepts ownership of the idea needs to have the support of the other players and needs to present them with the experience, skill set and tools that will allow them to extract value from the enormous opportunities that academic institutions present.

Studies of offices of tech transfer suggest that top universities have a propensity to patent because of a shift in agenda, and increasing competition from institutions with weaker research programs. [Jeff – is there any data on this – Stanford's change in agenda or indeed Imperial College London when Sir Richard Sykes (ex CEO of GSK) came on board] Furthermore, studies suggest that in addition to patents awarded, some of these leading universities have achieved a double digit annual growth rate in technology licensing revenues. The majority of these patents and associated revenues come from a few fields: Medicine (including biomedical), engineering, physics, agriculture and computer science.

Even when institutions do commit resource to technology transfer there is always the question of whether they could be doing it better; whether there are enough projects with enough success. In the UK the government has addressed this by encouraged universities to create spin-outs as a measure of successful transfer. This may have been fine in theory but practice has shown that this has led to too many spin-outs being created too early; the fledglings have been asked to fly before they were ready. Benchmarks for university research are difficult to develop because there is essentially no sector, other than a handful of non-university affiliated blue-sky research and development centers that have a similar function. One way of looking at productivity might be to ascertain whether ideas manage to attract outside funding, but in reality this decision is made a long way into the life of a new venture. The front end of the invention process, from the development of new technologies to licensing, is the primary function of top research universities, unlike R&D centers at corporations that must focus on the backend, such as applications and products. To compare Stanford with Pfizer is a basket of proverbial apples and oranges. Along with teaching and research, tech transfer is the core competency of research universities. So, the real issue is what rate of return and transfer, or other measure for value creation, should we expect from an institution that is in the research business. The answer ranges from more to much more.

There are four fundamental realities that universities must address to improve the effectiveness of technology transfer:

1. The core value proposition for technology transfer is produced by star researchers and communities of leading practitioners who now have more brand recognition, access to more resources, and more leverage over the research agenda itself than the universities in which they work. In order for technology transfer to work for the star researchers they need to want to commercialize their ideas without compromising their academic position.

2. These communities of star researchers and leading practitioners have a deeper knowledge of any particular subject matter than investors, and they have an established forum that helps them make sense of new ideas and identify a range of viable applications. However, their strengths and role in the process should be as inventors rather than entrepreneurs.
3. The management systems used by tech transfer offices to manage portfolios of ventures inadvertently slow them down and dumb them down.
4. There must be a community of experienced early stage entrepreneurs ready to work with the institutions rather than thinking of ways to bypass it.

Each of these issues will be explored further and potential solutions suggested.

The End of the Studio System

Movie mogul Louie B. Mayer talked about his actors under contract at his MGM studios like a proud parent. After all, he taught them the trade, gave them opportunities, and supported them during hard times. However, his tone changed to angry parent when the star system began to usurp his power and his actors turned their backs on the studio and pursued their own success. Mayer assumed that it was the studio that made movies. He was wrong; it was the actors and the cast of craftsmen that supported them. The value that Mayer provided was through the right marketing and distribution of the product.

Universities are like the studio system of old. It is in their best interest to produce stars; individuals and ensembles with tremendous talent and unique approaches to their craft. These people attract funding, rising stars, and good reputations for their institutions. However, as these stars become recognizable to their publics, the power and leverage the university has over them wanes. This can be seen in the investments university departments routinely make: Tenure, space, and budgets. When a researcher is a rising star, they must follow the University's rules. When a researcher is an established star, the University must follow their rules. When this comes to technology transfer the star must want to work with them and must see value in the "marketing and distribution" (agent and service provider) for his product rather than university administration. In addition to this there is a community of strong but "also starring" researchers who need technology transfer support and must rust the system to do the right thing for them

Increasingly, these stars are asking "What value does the University add to my work?" They expect more and better support for the significant percentage of their resources they remit to their institutions. They have established communities of thought leaders and have direct access to capital and resources. They simply do not see the value in working with the current system. They have at their disposal a host of professional service providers that take the burden of creating value off their shoulders, circumnavigate intellectual property issues, including the Bayh-Dole Act, while maintaining a greater percentage of the ownership than the University tech transfer model can provide.

So why does technology transfer not work in so many places right now. In the first instance it is because the emphasis is often on best practice administration rather than an

informed service provider and the people that excel at the former will not necessarily do so with the latter. We have the wrong sort of people in place.

It Takes a Villager

Communities of practice predate centralized development systems in many ways are now replacing them. Inexpensive and pervasive communication technology and software applications have made this possible. Researchers collaborate directly with each other with little need for the middleman. Ironically, community development is one of the core competencies that universities possess and have not effectively leveraged to their advantage.

Just as this can spark development in research so it can provide invaluable insight to technology transfer. Experts within these communities are far more likely to recognize a winning idea earlier than an investor because they have both deep knowledge of the field and an ongoing dialog with peers to consider possible applications. These communities have both the culture and competencies to encourage speculation and creativity. If they also have experience and are commercial they have the advantage of knowing a winning idea before others recognize it.

These communities extend well beyond the boundaries of any single university. Members typically hold several deep affiliations with other institutions and agencies. Also, boundaries between private and public work are often blurred because these connections extend to business relationships. Research is just as likely to happen across of federation of organizations as it is in one. This makes listening posts of limited value because it is extremely difficult to drop into the right conversation at the right time. Even within an institution an audit of ideas will miss the winners. Only a recognized villager who travels as a member of the community is positioned to listen in and make sense of the conversation.

Playing a New Game with the Old Equipment

In the 1950's, American companies began developing a series of quantitative methods to effectively maximize the productivity of resources invested in the development of new products. These interlaced tools such as performance metrics, toll-gate product development systems, and product portfolio management processes were forged in the furnaces of investment banks and conglomerates like Proctor and Gamble. The methods developed were used to centralize and prioritize all investments on neutral criteria such as relative rates of return and relative technical risk. They were employed to create a clear picture of the past and present, but provided little information on what the future might bring.

How do you measure the future? You don't. More importantly, excessive measurement and data gathering about the future is often a form of resistance to action. Researchers understand that a diverse array of experiments is required to find the future; to create it. As investors learned the hard way through the dot.com debacle, complex, slow, and

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bureaucratic systems that once worked in bygone era are no longer effective. The rate of technological and market development moves far too fast for these processes. These methods favor the convergent and quantitative not because these measures are more predictive than divergent and qualitative data, but because they are easier to measure. At the other end of the spectrum is the approach of simply following a mixture of experience and intuition. This was the path taken by many as the investment and management of anything to do with the internet broke free of traditional methods. There were no available alternatives and a fear of missing opportunities led people to invest in and manage businesses with less and less information.

Unfortunately, many offices of technology transfer have fully adopted the traditional approaches, often under great duress from government granting agencies, or have followed the experience and intuition route. This leaves them unable to use contemporary approaches to effectively prospect value creation in an age of discontinuity and hyper innovation. Instead of increasing the speed of technology development and transfer, their methods often serve to slow it down or back the wrong businesses

Is There Anybody Out There?

An essential part of the development of a fledgling business is the support and momentum that can be provided by entrepreneurs. The skill set is very different to that of the star researcher but complementary. Without this a business can have excellent science or technology, inspired strategic vision and no way of delivering it in practice. Communities of entrepreneurs ready to fill this role exist around all the leading universities but in many cases do not have the confidence in the system to work with technology transfer. Why impose the cost and friction of a middleman if the value can not be clearly seen from all sides? Technology transfer is caught again in the doom loop of not being relied upon to delight its customers and deliver value.

Back to the Future

So where can we go with this. There is a need for change and a willingness to take action, but as yet there does not seem to be an attractive answer. In some fundamental ways, universities operate much in the same way that they did during the Renaissance: Diverse communities of practitioners, master and apprentice relationships, studios and labs, philosophical speculation, an ever changing array of experiments, and vigorous debate and dispute. These forms of creative tension and collaboration are still the primary experiences of university life. Members of these universities retain deep feelings of allegiance and community. These affiliations are central to their identity as every endowment officer knows. These communities are the magnet, because bright and imaginative people want to be around other bright and imaginative people.

The key to more successful tech transfer may well be the ability to effectively support these communities in their natural purpose, to develop people and knowledge, and extend both to more pervasive and extensive communities.

Power to the People

What would universities do if they eliminated their traditional technology transfer offices? They would turn to individual researchers who were leaders within communities of practice for advice and opportunity. They would treat researchers like customers and offer them support and reward in forms desirable to these customers, such as freedom. They would engage people like Robert Oppenheimer who brought together the team of physicists that achieved the wildly ambitious goals of the Manhattan Project, only after military commanders had repeatedly failed. They would provide a service that satisfied their customers' needs and that the customer really wanted. This would quickly become the genesis of a new tech transfer process and all its related functions to support the community of practice.

This would also need to facilitate the development of new businesses. However, it's a seller's market only if you have something worth selling. Since these communities are highly fluid, the new tech transfer would design on-ramps and off-ramps so that researchers can more effectively collaborate on a project by project basis as we have discussed above. Many of these researchers have multiple affiliations and their work, and related value, travels with them. The old boundaries that define who works where and who owns what don't apply well in the world of knowledge creation.

This is the challenge for more effective tech transfer offices; they will have to extend their charter to begin well upstream of commercializing technology. They need seamlessly to prospect for winning ideas before they become winning ideas. They need to be a valuable and valued part of the process. They need to figure out how all these researchers, their communities, and their work connects to create something of value. They need to be the hub to spokes of many communities of practice. They need to be located where the action is happening; not somewhere in a central administration building. This will require deputizing thought leaders who are well connected and respected in the community. This does not mean the Dean of the research area, for these leaders are often seen as bureaucrats by these constituencies. These leaders know how to work within these communities to create new technology. More so, they can be effectively engaged to find adjacencies and new applications for their research that a technology office would find difficult to recognize.

If You Build It, They Won't Come

Why centralize tech transfer process? The trend in science and business is to decentralize. To operate more as self-directed units which loosely operate as a federation. Surely, the University demands of resource allocation, project development and intellectual property protection are no more complex than those found in commercial enterprises. More so, many companies are highly regulated by the government. Companies are exiting the centralized transfer and incubation model, and universities need to follow suite. Yes, research and technology is complex, this is all the more reason for management systems to move toward simplification. What would the tech transfer management processes look like from the perspective of the researcher? What if the first question asked was "what do

our customers need?” What if it was built bottom up instead of top-down as is customary with stage-gate and portfolio management systems? These traditional financial decision making systems give the illusion of control, for they reveal little about how research becomes a great technology. They only keep score of the game when it's too late to change the outcome.

Offices of technology transfer would be well served to establish a framework for a common mindset and language that can be shared by researchers, professional service providers and investors alike. The Competing Values Framework works well in this function because it is not domain specific and recognizes that there are many answers to what is “good”, depending on product, customer, stage and industry among other criteria. These are the very things that define value at this stage. This framework could be embedded so it travels seamlessly through all the stages of the process: Sourcing and stimulating ideas, launching experiments, picking winners, managing development, and harvesting technology. This type of framework could be used to develop metrics for intangible assets, such as culture and competencies, and measure them using the same performance dashboard system as hard financial measures. These future measures are the fundamental value proposition for researchers and offices of technology transfer alike for they indicate where the opportunities will emerge.

Firms like GE have simplified creative jumpstart and workout processes that were developed by their researchers to help them quickly launch new projects. They have little need for reporting in and out of these projects because the method is the same from the top to the bottom of the organization. Everyone is asking the same questions and considering the same strategic themes. The specifics are customized and operationalized by each team. These jumpstart processes underlie the operating rhythm of the firm. That is, the jumpstart is used to craft the strategy, set performance measures, and staff teams. This is a process that could be used in tech transfer. It is not resource intensive and combines aspects of the researcher, entrepreneur and venture capitalist on one.

Actually Use the New Technology to Find the New Technology

How do you discover who is an expert in any given subject at any given time? You monitor who talks to whom about what. In addition to think tank sessions, conferences, and listening posts, this can be done digitally through e-mails, databases and file servers. A wide range of relatively inexpensive commercial applications exist to transparently track these digital breadcrumbs. The problem is that it is far too easy to focus on a single project because it has a more tangible and immediate payout. The real value lies in an understanding of patterns of collaboration because they tell us specifically how knowledge is being created and provide a mechanism to mine it.

Idea markets are another technology-enabled process widely used in commercial R&D. Idea markets, comprised of a virtual and diverse community experts or potential customers, help firms identify emerging technologies and focus on which ones to develop into innovations. Idea market participants are given votes to cast on their preferences and opinions about complex issues such as the relative attractiveness of a new fashion. These

networks quickly tell companies what to make and sell, because it starts with what customers want to buy. More importantly, these idea markets need not be based on any current product or application, but rather, are used to engage the customer in imagining possible uses of new technologies. They directly connect creators and their patrons.

Idea markets are now being used to predict which technologies will be a hit with consumers. HP uses idea markets with its field sales organization to predict sales volumes of new products. These markets work by identifying the range of possibilities and their relative value much like the process a banker goes through when pricing an option. By letting the right people participate, an organization, legal or virtual, can quickly determine what will work, what won't, and how to make real time revisions. Idea markets can be used to measure not only traditional financial success, such as yield rates, but also point to emergent opportunities.

Experiment with Tech Transfer

What if tech transfer didn't only enable experiments, but were treated as one? That is, what experiments would we run if we wanted to develop a more innovative way to support the transfer of technology?

- We would have a vision, a story, and a brand
- We would start with small projects
- We would enlist the tribal leaders of communities of practice
- We would show these clients how much we love them
- We would build our processes to support these communities
- We would start in specific departments that supported our experiments
- We would benchmark our successes against those of existing tech transfer offices
- We would review and revise as we went along
- We would quickly see if technology could be transferred more effectively

If we are to keep up with innovations we seek to transfer, we must become innovative in the way we approach sourcing, stimulating, picking, managing, and harvesting new technology.