

Localizing the Commercialization of UC Berkeley Innovations: A *Justification, Strategy & Plan to Take the Campus to the Third Tier of Innovation Ecosystems*

1. Introduction

Catalyzing, accelerating and localizing the commercialization of innovations that result from university research are three key components of some of the most successful regional economies – and also their universities. While localizing the commercialization of a university’s innovations is obviously beneficial to the local community’s economy, some might question why localizing commercialization is highly beneficial to the university. The answer is that localizing commercialization builds an ecosystem that fuels more opportunities for university faculty and students. Accordingly, if a university has a robust local innovation ecosystem (for example, at MIT, Harvard, Stanford and UCSF), then that attribute can be attractive to top faculty, students and corporate research sponsors.

UC Berkeley (UCB) is a leader in two of above three components: catalyzing and accelerating the commercialization of innovations developed on the campus. However many of UCB’s innovations are commercialized outside of the local community. Consequently, the campus and its neighboring community are not leveraging many of the benefits that are gained from the commercialization of UCB (and LBNL) innovations. To be clear, this is not only a lost opportunity for Berkeley’s local economy, it’s also a lost opportunity for UCB’s research and education missions.

To address this situation, this paper, (1) summarizes UCB’s status in catalyzing, accelerating and localizing innovation commercialization, (2) highlights how Berkeley’s *innovation-drain* is a lost opportunity for the UCB and LBNL local innovation ecosystem, and (3) outlines a strategy and plan for addressing this lost opportunity.

2. Catalyzing, Accelerating and Localizing Commercialization

Localizing the commercialization of university innovation is tightly related to the overall commercialization process – and in particular, catalyzing and accelerating commercialization. Research on the commercialization of over 50 UCB innovations identified four common patterns, or pathways, by which innovations get commercialized at UCB (as well as other universities). These pathways are characterized as the 4Ms: *morphed, mined, milked* and *market*¹ (see Figure 1). The 4Ms were subsequently used as a framework to comprehensively identify how UCB along with LBNL support activities to catalyze, accelerate and localize innovation commercialization (see Table 1). These three tightly related activities are highlighted in this section.

¹ "Cohen M, [The 4M Framework for How University Innovations Get Commercialized, and Corresponding Ways to Optimize University IP Policies and Practices](#)", *les Nouvelles - The Journal of the Licensing Executive Society*, December 2008: 256-260.

2.1. Catalyzing Commercialization

There are numerous mechanisms by which UCB and LBNL catalyze the commercialization of innovations resulting from the research at these interrelated institutions. For example, several UCB organizations run technology, innovation and business plan competitions that systematically bring together innovative campus researchers, entrepreneurial students, and investors. The Business School has a popular Cleantech to Market course in which graduate students apply their business, engineering, scientific, and legal knowledge to help translate UCB and LBNL cleantech research into market opportunities. The Business School also has an entrepreneurship speaker series, along with office hours for venture capitalists to meet with campus entrepreneurs.

Furthermore, UCB and LBNL license the intellectual property (IP) associated with the innovations developed by their researchers. As depicted in Figures 2a and 2b, these IP rights agreements can improve a company's business model and thereby catalyze their ability to obtain the investments required to support these high-risk endeavors. In each of the past three years, UCB has established about 40 IP rights agreements with companies. About half of those companies were startups (i.e. pre-production revenue), and about half of those startups could be characterized as Berkeley spinouts.

2.2. Accelerating Commercialization

In addition to catalyzing the commercialization of its innovations, UCB also supports activities that speed-up the potential success of companies working to commercialize UCB and LBNL innovations – particularly spinouts. For example, UCB recently established a mini-incubator in Stanley Hall that is oriented towards bioscience spinouts associated with QB3 and/or using the Biomolecular Nanotech recharge facility. In addition, for years, the Haas Lester Center has been operating a bare-bones mini incubator in the basement of the nearby Bancroft Hotel.

These incubators can accelerate the progress of spinouts by enabling the founders to focus on R&D – not dealing with office space, equipment, furniture, etc. Also, by clustering these startups, they learn from each other and they become readily accessible to (and magnets for) professional management support that helps the startups navigate pitfalls that slow or derail their progress.

2.3. Localizing Commercialization

The pipeline of startups that spin out of UCB and LBNL is an innovation ecosystem development opportunity that we can either squander or leverage. To be clear, leveraging this opportunity by localizing commercialization means more than the local community hosting the initial site of a spinout; instead it means that the local community retains the headquarters (i.e. the core human capital) for that company as it grows its revenues and employees.

In comparison to other US research universities, UCB is strong in catalyzing and accelerating the commercialization of its innovations. However, in comparison to some other top-tier research universities (e.g. MIT, Harvard, Stanford and UCSF), UCB is relatively weak in localizing the commercialization of its innovations. The reasons for this weak localization include the following:

1. Lack of local office space with attributes that are conducive to small technology-oriented companies in general, and especially a lack of local “wet space” for bioscience companies. These insufficient attributes include space that has incremental expansion opportunities, as well as space with flexible, short term, low priced leases. For example, compared to Cambridge’s Kendall Square, Berkeley’s downtown (and West Berkeley) has a dearth of this type of space.
2. Lack of marketing that encourages and simplifies a “default” pathway for spinning out of the campus into local office space. For example, until recently (October 2010) Berkeley entrepreneurs couldn’t go to a website that lists available office space near the campus (<http://www.berkeleystartupcluster.net/Space>). In contrast, Palo Alto has had this type of web service for years. Unfortunately, most local entrepreneurs aren’t aware of this new Berkeley web service because, to-date it has not been promoted in the UCB and LBNL innovation ecosystem.
3. Lack of a local organization that orchestrates activities and services to nurture tech-oriented startups. In contrast, Silicon Valley has a plethora of these organizations, and the UCSF – Mission Bay innovation ecosystem has the QB3 Garage Network.
4. Low barriers to exit. The above deficiencies are exacerbated by Berkeley’s proximity to two of the most attractive areas for startups: Silicon Valley and the SoMa area of San Francisco. In contrast to startups spawned in – for example, Austin or Seattle, Berkeley’s proximity to Silicon Valley and San Francisco makes it relatively easy for UCB and LBNL spinouts to attrit to those areas.

3. Innovation Drain & the Opportunity for UC Berkeley

Berkeley’s weakness in localizing the commercialization of innovations developed at the campus and lab can be characterized as an “innovation drain”. Innovation drain is analogous to brain drain in that it’s a loss of homegrown assets, and correspondingly a lost opportunity to benefit from those assets (and investments).

In addition to the obvious lost opportunities for local economic development, Berkeley’s innovation drain is a lost opportunity for UCB’s research and education missions. As depicted in Figure 3, if Berkeley could halt (or merely slow) this innovation drain and thereby establish a thriving area of innovation commercialization in near proximity to the campus, then UCB’s ensuing relationships with those companies should result in more of the following opportunities for UCB:

1. Sponsored research from corporations;
2. Sponsored research from young companies (via SBIR and STTR grants);
3. Visiting industry fellows;
4. Entrepreneurs in residence on campus;
5. Advisory, board and consulting roles for faculty;
6. Careers, internships and summer jobs for students;
7. Customers for UCB and LBNL user recharge facilities; and
8. Serendipitous discussions between researchers, entrepreneurs, investors, etc.

By decreasing innovation drain, and correspondingly increasing the local commercialization of Berkeley innovations, we could integrate the emerging tech community around Berkeley into the combined innovation ecosystem of UCB and LBL – thereby creating a supercritical mass that self-propels the continued growth of the ecosystem – as depicted in Figure 4.

4. Increasing Localized Commercialization

This section discusses ways to increase the local commercialization of UCB and LBNL innovations. It starts with a synopsis of what other UC campuses are doing to achieve similar objectives; then it describes a strategy for Berkeley's localization initiative; and finally, it lists recent, imminent and proposed efforts to execute the strategy.

4.1. What other UC Campus are Doing

In varying degrees, most of the other UC campuses and their local communities are pursuing opportunities to catalyze, accelerate and localize commercialization of their innovations. For example, many campuses have on-campus incubators – including UCSF, UCLA and UCI. The incubators at those three campuses are associated with their CISIs (i.e. QB3, CNSI and Calit2).

Note that while a campus incubator can help accelerate innovation commercialization, an incubator alone, is not a robust approach to localizing innovation commercialization. More specifically, if the on-campus incubator doesn't provide a compelling pathway for incubator graduates into the local innovation ecosystem (i.e. local office space and startup networks), then those startups could relocate to global centers of entrepreneurialism such as Silicon Valley. This is exemplified by the Lester Center's Bancroft Hotel incubator in that most of its graduates are no longer located in Berkeley.

A more comprehensive approach to catalyzing, accelerating and localizing innovation commercialization is best represented by perhaps the most successful UC campus to localize innovation commercialization -- UCSD. In 1985, UCSD along with the City of San Diego and their private sector established CONNECT. The success of this regional organizational is described on this web page: <http://www.connect.org/about/>.

4.2. Localization Strategy

Silicon Valley and San Francisco offer outstanding location opportunities for Berkeley spinouts. Consequently, for Berkeley to offer a superior local alternative to those areas, it must have a differentiator that gives it a sustainable competitive advantage over Silicon Valley and San Francisco.

While it's important for a UCB local alternative to have office space with basic attributes (i.e. price, expandability and quality) that are competitive to office space in Silicon Valley and San Francisco, those basic attributes – alone – aren't likely to enable the UCB local alternative to overcome the draw of Silicon Valley and San Francisco. Instead, the UCB local alternative needs a distinct, sustainable advantage.

For Berkeley spinouts, a plausible sustainable competitive advantage that a Berkeley area can have over Silicon Valley and San Francisco is walking distance proximity to the campus. As

depicted in Figure 4, for startups spinning out of UCB and LBNL, this proximity differentiator would enable the teams to:

1. Readily (continue to) collaborate with UCB or LBNL colleagues (including collaborations funded by SBIR and STTR grants);
2. Easily (continue to) access the unique user recharge facilities at UCB and LBNL;
3. Simply keep their residences and commutes intact; and
4. Conveniently juggle completing their UCB degree program while pursuing a startup.

This near proximity advantage doesn't literally mean a short walk. Instead, it metaphorically includes a simple shuttle or bike ride (or possibly even a very convenient car ride that includes readily accessible parking). The distance and access between Kendall Square and the sprawling MIT campus demonstrates the figurative and symbolic nature of proximity.

In contrast, if the UCB local alternative requires UCB entrepreneurs to walk blocks to their cars and drive for over 20 minutes through Berkeley to their office, then it's only nominally more of an effort to (take BART or) drive an additional 10-15 minutes to San Francisco, or an additional 15-20 minutes to the northern edges of Silicon Valley. In other words, that nominal marginal difference weakens the proximity competitive advantage that Berkeley could leverage.

This proximity advantage is plausible because it's a natural advantage in that it doesn't require an unidentified large source of capital to develop it. Likewise, it's a sustainable advantage, because the essential attribute – proximity to UCB and LBNL – can't be duplicated elsewhere. It's also scalable advantage because experts claim that after a startup reaches about 20 employees, then too many of the existing employees would be alienated if the young company changed its geographic center-of-mass by relocating out of its vicinity (i.e. from Berkeley to Santa Clara).

4.3. Localization Plans

To address the aforementioned impediments to local commercialization, and implement the UCB proximity strategy, the following plans are underway, imminent or proposed.

Education and Promotion Plus Learning

To address the lack of local Berkeley office space conducive to technology-oriented startups (and corporate research sponsors), an education and promotion initiative was launched. In addition to learning more about the impediments to local commercialization, this initiative has focused on the following four target audiences and messages.

1. City Land-Use Officials: Starting in 2009, City of Berkeley land-use staffers, commissioners and elected officials have been educated on ordinances and practices conducive to attracting small and large R&D-oriented companies. This educational process has had an impact on the proposed adjustments to the West Berkeley zoning plan as well as downtown Berkeley. We also learned about the limits of, and pressures on the zoning ordinances related to R&D-oriented companies.

2. Building Owners and Developers: Starting in 2010, Berkeley building developers, owners and operators have been the target of a campaign (called “if you build it, they will *stay*”) in order to educate them on the opportunities to provide office space conducive to small and large technology companies in proximity to UCB. We also learned about the local disincentives for R&D-oriented office development.
3. Private Sector Businesses: Through discussions with the Berkeley Chamber of Commerce and the Downtown Business Association, local business leaders have been educated on how the emergence of a thriving tech sector in Berkeley would benefit all businesses in the area – including retail, restaurants, entertainment and individual practitioners. We also learned about how to leverage the local business leaders.
4. Faculty & Staff: Starting in the second half of 2010, discussions with staff and faculty (mostly in the College of Engineering as well as Haas) revealed that there is some consensus that if we can decrease the innovation drain, localize more of the commercialization of Berkeley innovations, and thereby build a local ecosystem of tech-oriented small, midsize and large companies, then that would be beneficial to the campus (both faculty and students).

Tech Community Organizations, Incubators & Innovation Centers

A multifaceted approach is necessary to address the lack of a local tech-oriented community and the corresponding establishment and marketing of office space, activities and services. This multifaceted approach requires a constellation of varied incubators and innovation centers for the local innovation ecosystem that encompasses UCB, LBNL and the commercial areas in proximity to UCB. Likewise, the multifaceted approach requires coordination with numerous people and groups including: the COE, CITRIS, QB3, CET, C2M, the Lester Center, the Office of Community Relations, the campus Economic Development Steering Group, IPIRA and LBL TTO as well as the East Bay Green Corridor and the City of Berkeley.

Before elaborating on this multifaceted approach, the concept of an incubator and an innovation center should be clarified. The concept of an incubator has been evolving over the past several years. Previously, incubators provided startups with shared services for Internet connectivity, phone lines, voice mail, computer servers, faxes, copiers, etc. However with the advent of WiFi, laptops, cell phones, and cloud computing, these days a café could qualify as an incubator for an IT-oriented entrepreneur. Therefore, for the purposes of this plan, an **incubator** is defined as not only physical space conducive to startups, but equally important, as access to professional networks that help startups. Also, for the purposes of this plan, **innovation centers** are defined as facilities for established tech companies (i.e. anchor tenants) and fast growing post-revenue young companies – as well as nascent startups.

The needs and opportunities for biotech and info-tech oriented startups are sufficiently different to warrant separate (but related) approaches. Moreover, the construction of the Helios EBI building in downtown Berkeley also warrants a separate approach. Each of these three approaches is summarized below.

Biotech: As a result of the above education process, collaboration is underway between UCB, LBNL, QB3, the City of Berkeley and a large bioscience office park to establish the QB3 East Bay Innovation Center (EBIC).

The EBIC is targeted for opening in mid 2011, and it will be located adjacent to the Berkeley National Lab's new Joint Center for Artificial Photosynthesis (JCAP) as well as about 2 million square feet of Berkeley office space conducive to biotech companies as well substantial biotech office space down the road in Emeryville. While the EBIC is not walking distance to UCB, it will be accessible by shuttle and has parking for drivers. Moreover, its proximity to an abundance of wet space will help keep the EBIC companies local as they graduate out of the incubator into the adjacent commercial space.

The EBIC will be marketed as part of the QB3 Garage Incubator Network (along with the mini incubators in UCSF's Byers Hall and UCB's Stanley Hall as well as the facility in FibroGen Inc's Mission Bay building). This co-marketing will enable the EBIC to leverage that network's high occupancy rate and established referral system. Moreover, the EBIC should become the default path for spinouts graduating out of the mini-incubator in Stanley Hall.

Info Tech: As a result of the above education process, collaboration between UCB, the City of Berkeley, the Downtown Business Association and private sector companies has established the Berkeley Startup Cluster (BSC). The BSC's goal is to establish the commercial area in walking distance to UCB (i.e. downtown Berkeley) as a destination and thriving area for technology-oriented companies. The BSC's goals, strategies, priorities and services are discussed on its website (and therefore not repeated in this document): <http://www.BerkeleyStartupCluster.NET>.

As shown on the BSC website's list of companies, the BSC seems to be especially conducive to software oriented startups working in areas such as web services, mobile apps, wireless sensors, real-time solutions, and gaming. Therefore, connections are being forged between the BSC and the relevant UCB departments (i.e. the CS department).

The BSC already has commitments of support from established local companies.

Alternative Energy: The Helios Facility current under construction in downtown Berkeley could be a catalyst for new alternative energy and biofuels companies. Just as electronic design automation spawned an industry of fab-less semiconductor companies in Silicon Valley, perhaps the EBI could spawn farm-less synthetic biofuels companies in corridor from downtown Berkeley through southwest Berkeley and into Emeryville. Accordingly, as part of the BSC initiative, building owners and developers in the vicinity of the Helios Facility should be educated on how to take advantage of this opportunity.

Near Term Plans

As of this version of this document, here is a partial list of near term plans for this local innovation ecosystem development initiative:

Figure 1 –

The 4Ms of University Innovation Commercialization

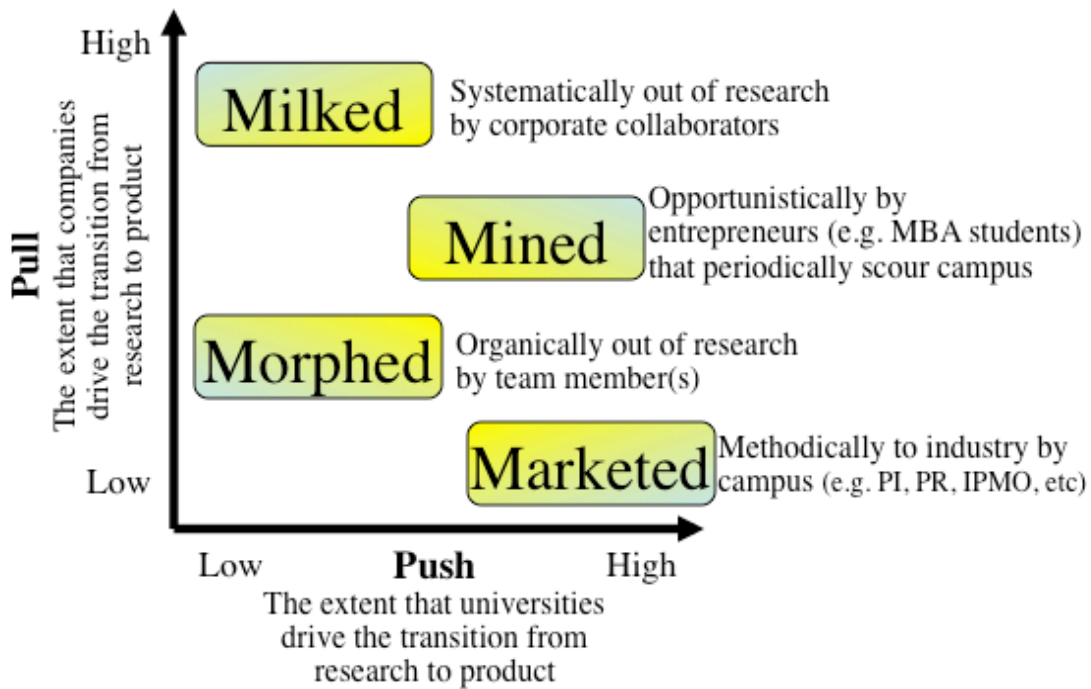
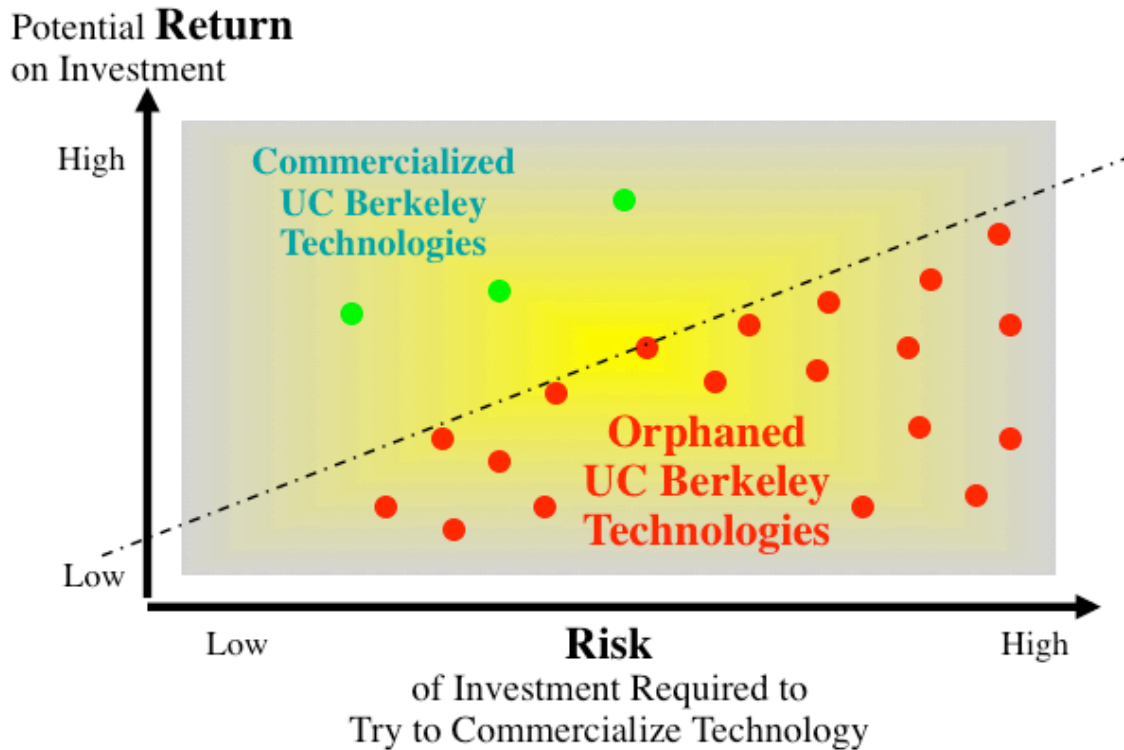


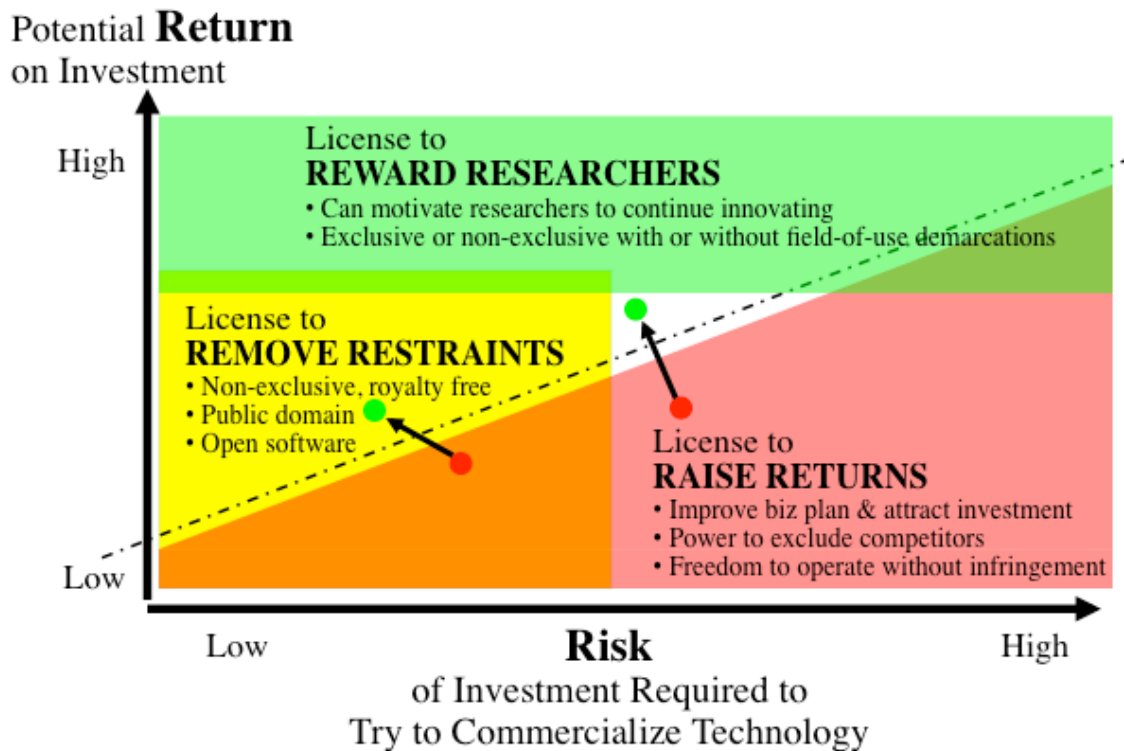
Table 1 – UC Berkeley’s Entrepreneurial Ecosystem in Context of the 4Ms

Pathways (4Ms)	Activities, Catalysts, Programs, Initiatives	Recent Progressive Approaches	Offices	Ideas & Comments
<i>Morphed</i>	<ul style="list-style-type: none"> •Entrepreneurship classes •On-campus Incubators •Entrepreneurial Admissions •Entrepreneurial Culture 	<ul style="list-style-type: none"> •On-campus incubators co-located with user facilities •Berkeley Startup Cluster 	<ul style="list-style-type: none"> •CET (CoE) •Haas (MOT, Lester) •OTL 	<ul style="list-style-type: none"> •SBIR/STTR help center
<i>Mined</i>	<ul style="list-style-type: none"> •Entrepreneurial MBA Program (EIRs) •Biz Plan & Tech Competitions •Research-to-Market Courses (C2M) •Seminars & Poster Sessions (YAPS) •Haas Speaker Series & VC Office Hours •Haas Bancroft Incubator 	<ul style="list-style-type: none"> •Cleantech-2-Market Course •Berkeley Startup Cluster 	<ul style="list-style-type: none"> •Haas (Lester) •OTL •CoE •CITRIS •QB3 •Student Clubs (BERC) 	<ul style="list-style-type: none"> •Berkeley Center for Growth Companies
<i>Milked</i>	<ul style="list-style-type: none"> •Institutional response to RFPs •Opportunistic PIs •Sponsored Research Agreements •Visiting Industrial Fellows •Faculty Consulting & Student Hiring 	<ul style="list-style-type: none"> •Research-Oriented Approach to Managing IP rights (e.g. NERFs, BIP, SRA IP grants, etc) 	<ul style="list-style-type: none"> •VCRO •IPIRA (IAO & OTL) •CoE •CITRIS •QB3 	<ul style="list-style-type: none"> •Adjacent R&D Office Parks/Buildings •Research Enterprise Marketing
<i>Marketed</i>	<ul style="list-style-type: none"> •Newsletters & Press Releases •Searchable Web Listings •Serial Entrepreneur & VC Discussions •Scholarly Publications & Presentations 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •CoE •OTL •NewsCenter 	<ul style="list-style-type: none"> •EBGC Customer Cred Program •Email Mrktg

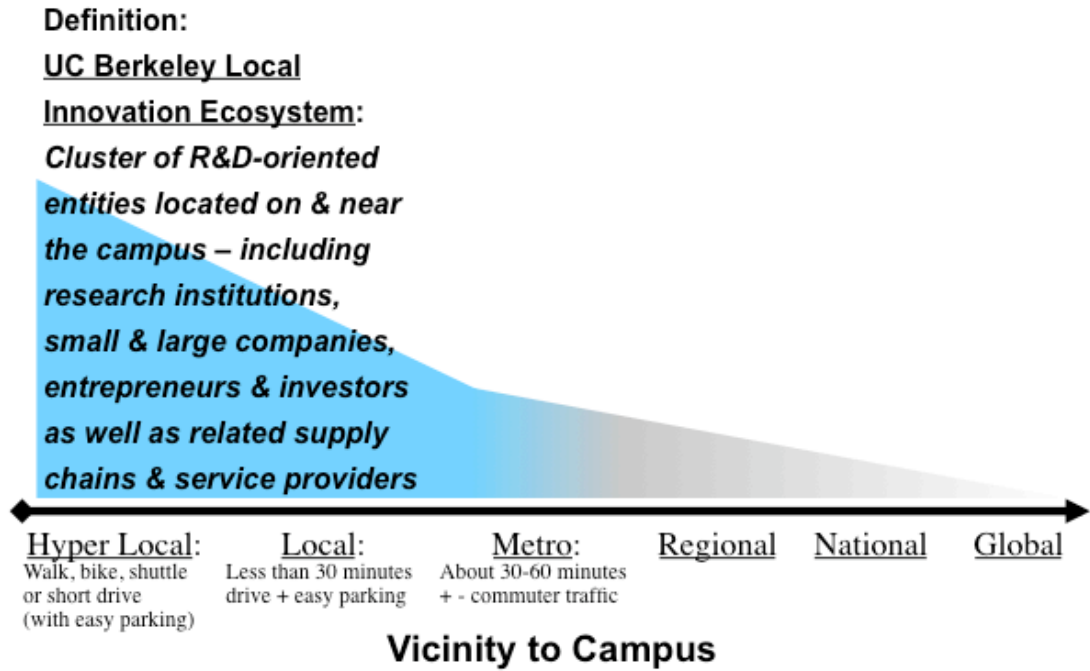
**Figure 2a -
How IP Rights Agreements Can Catalyze Commercialization**



**Figure 2b -
How IP Rights Agreements Can Catalyze Commercialization**



**Figure 3a –
Definition of UC Berkeley Local Innovation Ecosystem**



**Figure 3b –
Taking UC Berkeley to the Next Level of Innovation Commercialization**

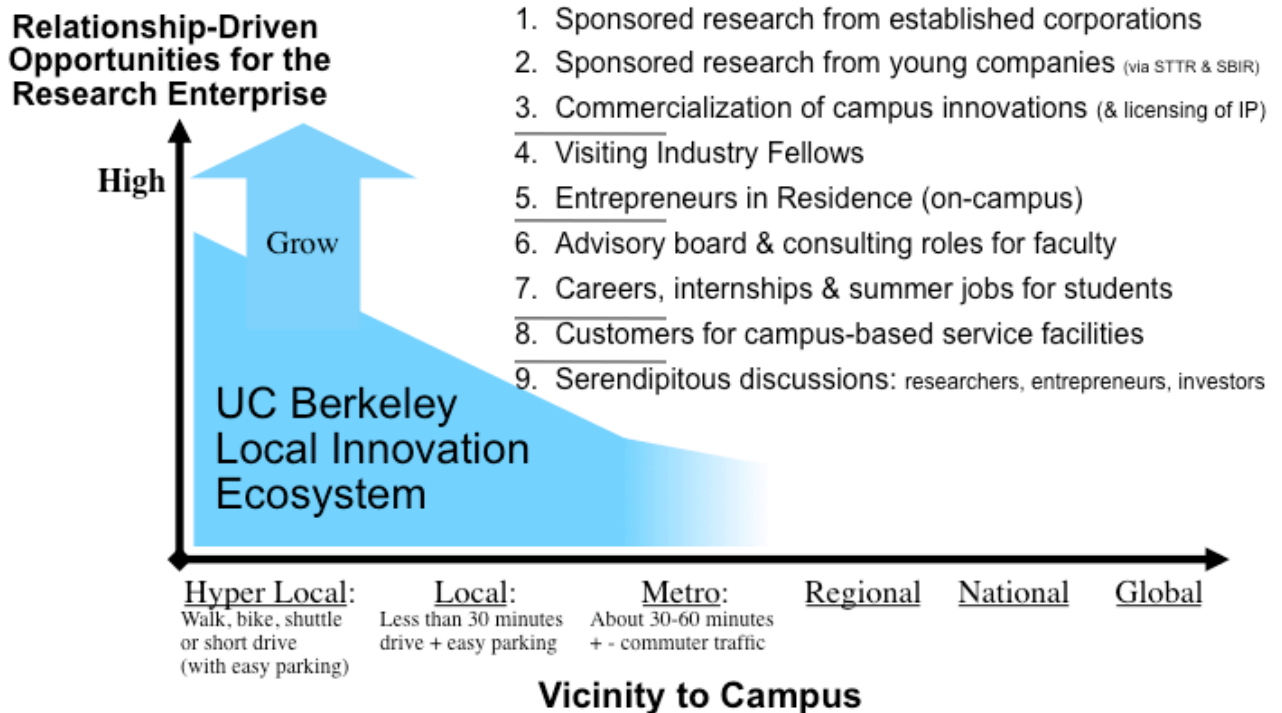


Figure 4 -
Grow the Local Innovation Ecosystem

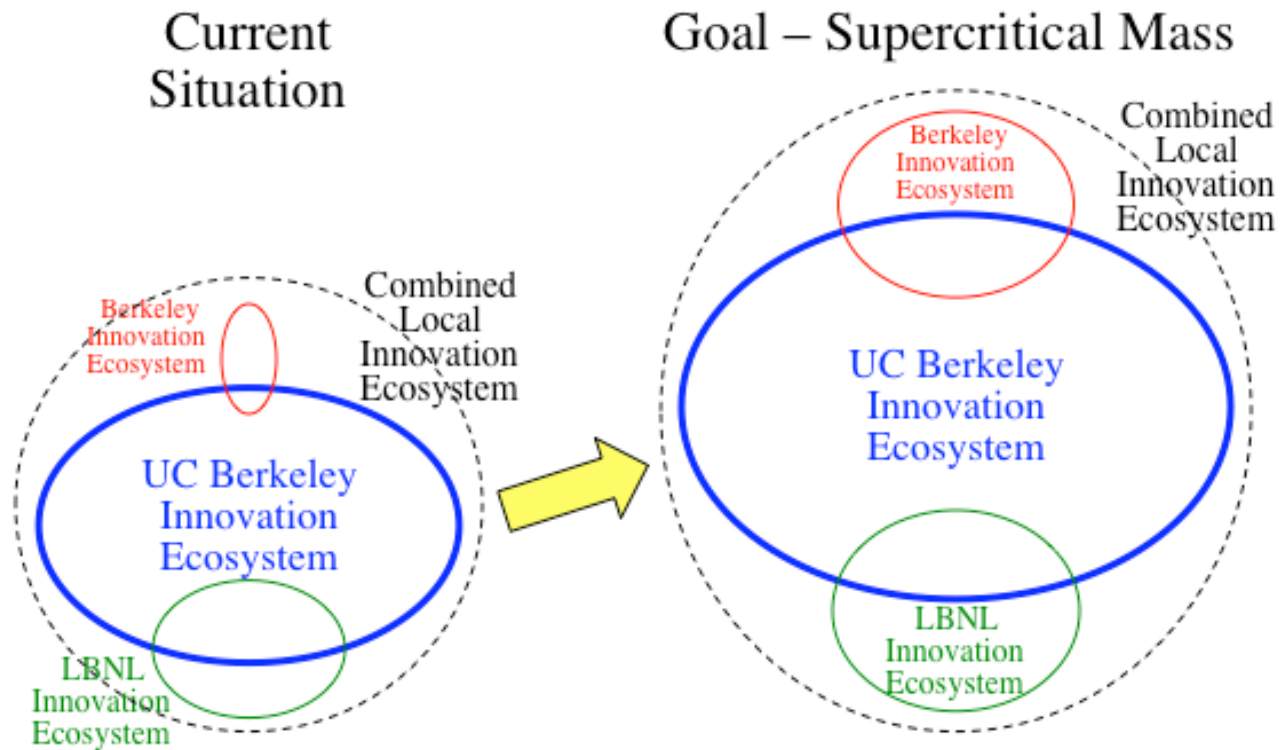
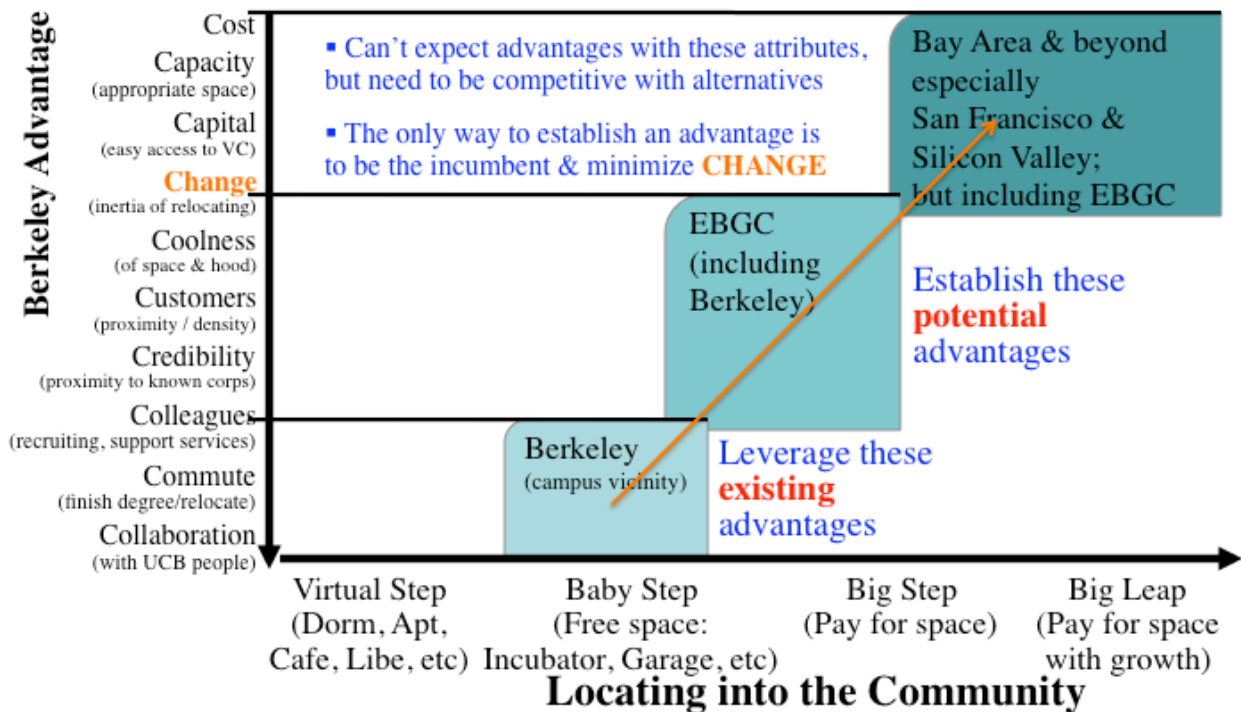
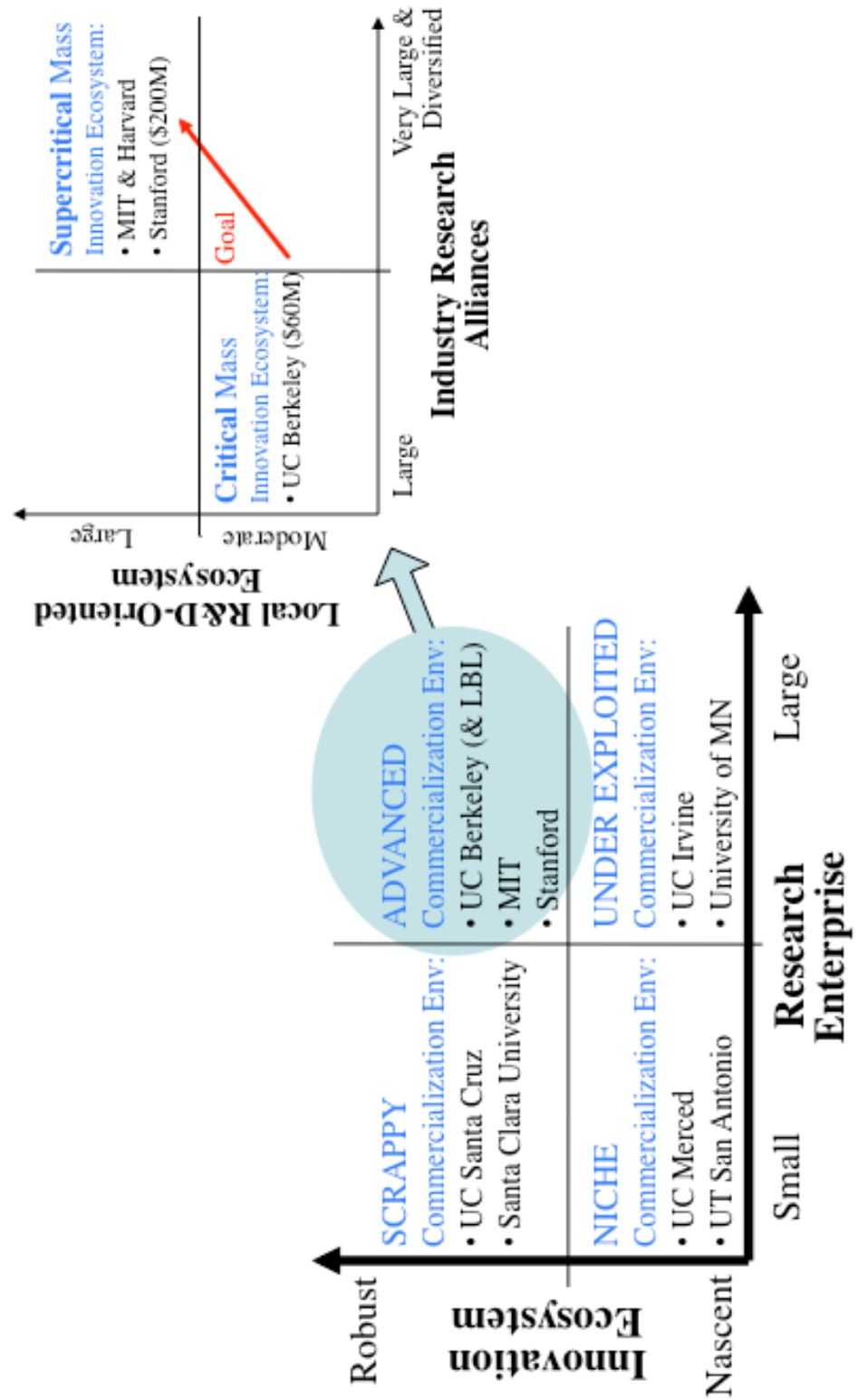


Figure 5 -
Taking UC Berkeley to the Next Level of Innovation Commercialization



**Figure 5a & 5b -
Taking UC Berkeley to the Next Level of Innovation Commercialization**



**List 1 -
Top 10 Entrepreneurial Ecosystem
Programs, Activities & Events
to Maximize the 4M University Commercialization Pathways**

1. Entrepreneurial MBA & technology management programs
2. Business plan & technology innovation competitions
3. Research-to-market assessment team projects as part of curriculum
4. Open seminar series & poster sessions in sciences, engineering & business
5. Office hours hosted by local venture capitalists & serial entrepreneurs
6. IP management office with *research-oriented approach to IP*
7. Sponsored research office with experience & flexibility
8. Incubator facilities & services for young companies in various stages
9. Research parks for established corps to leverage campus & anchor startups
10. Guidance for SBIR & STTR opportunities