Article

California Tool Works: Assessing the Impact of Life Science Incubators and Accelerators

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ABSTRACT

With the proliferation of types and business models in incubation and acceleration, a landscape survey commenced nearly a decade ago with innovation professionals running accelerators, incubators, corporate innovation teams, venture studios, and maker spaces. The benchmarking continues under the auspices of the California Business Incubation Alliance. For this paper, a selected set of findings specific to biotechnology have been detailed, including best practices, success measures, outcomes, and economic impact. The perspective of entrepreneurs, innovation executives, investors, and the public sector have been taken into account throughout this exercise.

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INTRODUCTION

Matt Gardner is president of the California Biomanufacturing Center, president of the California Business Incubation Alliance, and a board member of InBIA. He has worked on innovation ecosystems for more than two decades.

For the last decade, the California Business Incubation Alliance has worked with hundreds of incubators and accelerators to explore the myriad ways they measure their own short, medium, and long-term impacts. This running dialogue, inside and outside California includes surveys, interviews, focus groups, regular meetings, and analysis of individual incubator and accelerator programs.

Widely regarded as one of the most difficult industries in the world based on barriers to entry, technology risk, and product development timelines, health care – and particularly health technology – requires patient capital and persistent entrepreneurs. In addition, with long lead times and extraordinary regulatory burdens, biotech startups face a gap in typical commercial real estate markets. Biotech startups commonly seek flexible, short-term space in small amounts, and often lack the underwriting and credit worthiness to make significant lease commitments.

Governments, universities, and economic development agencies have found cause to intervene in this market failure for decades, creating subsidized, flexible spaces with the capacity to weather high failure rates. This collaboration is based on a strong alignment of interests, as development in biotechnology generates significant capital investment, including lab-based tenant improvements, and high-skilled jobs with high multiplier effects in regional economies. The first California Tool Works survey identified this intersection of industry specificity and capital intensity through the Gardner-Hamaoui Matrix (Gardner et al, May 2016).[i] As a result, significant emphasis has been placed throughout these surveys on the forms of return on investment that might satisfy both the public and private interests in measuring startup success.

BACKGROUND

The process of creating and building a startup has been commoditized to the point that there are low barriers to

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i Gardner et al, California Tool Works, May 2016, p 58. https://drive.google.com/file/d/0BxOWZxPt8aPFT3k4VTlmaFN6RWs/view?usp=sharing

Figure 1: Number of U.S. Programs by Industry Investment Focus.

establishing a new accelerator. The average accelerator surveyed for California Tool Works injected more than $400,000 annually into its local economy.

As a result, the number of these programs has risen dramatically since 2010.

However, generation of energy, hardware, and life sciences (collectively sometimes referred to as "deep tech") incubators represent a very different level of investment and economic impact. The typical hardware or life sciences incubator requires millions in equipment, in addition to real estate and personnel, to commence operations.

The proliferation of programs has also led to increasing diversity of industry focus among these programs (Figures 1 and 2). Whether this is representative of programs attempting to differentiate themselves or investors directing resources are narrowly targeted industry niches is impossible to determine.

The net result is an increasing diversity of programs available to startups from almost any industry, ranging from the primary economy to manufacturing to the service economy.

The proliferation of programs in software and the digital economy is, at least in part, based on relatively low barriers to entry. Industries such as advanced manufacturing, life sciences, and microelectronics, have barriers to entry for startups and incubators alike.

Because of these barriers to entry, the proportionality of accelerators to incubators reflects the relative ease of entry into fields like software and digital marketing (Figure 2). Two-thirds of the programs in digital marketing, and nearly two-thirds in software, are identified as accelerators.

These definitions, however, remain problematic. SOS Ventures has taken its template from Hax and other acceleration programs and built a wet lab life sciences accelerator. Indie Bio offers the temporary use of wet lab facilities and some of the kinds of shared equipment life sciences startups need.

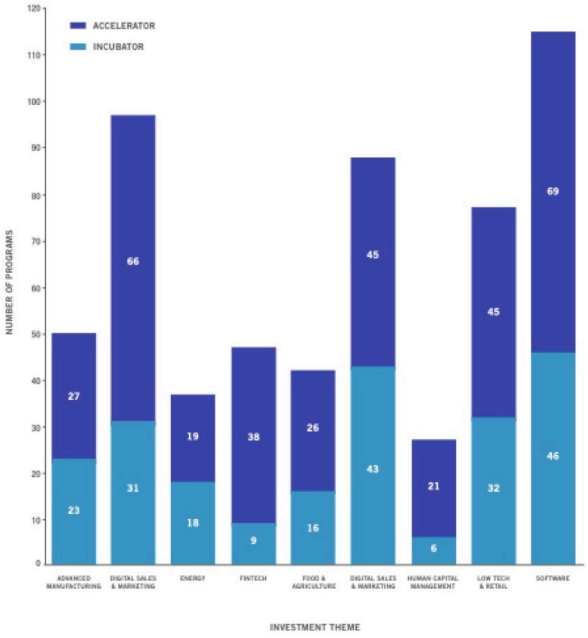

Figure 2: Program Type by Investment Focus.

SHARED RESOURCES, SHARED PROSPERITY

The investment thesis of many accelerators is oriented toward industries with low barriers to entry, including software, mobile, and e-commerce. Correspondingly, accelerators in those industries are more likely to have high volumes of startup throughput and deals. In more capital-intensive industries, such as advanced manufacturing and life sciences, the most active programs tend to specialize, as opposed to attempts to serve all industries.

The Gardner-Hamaoui Matrix is a means of typing incubators and accelerators according to how specific their focus is (X axis) and the richness of their resources (Y axis). Short cohort accelerators providing support to any kind of startup while emphasizing no physical space in favor of a mentor-driven model would fall into the bottom left quadrant as the most general and least resource-intensive programs. Wet lab incubators supporting therapeutic biotechnology companies would fall into the top right quadrant of the most specific, most resource-intensive type of startup support offerings.

In an attempt to classify accelerators by focus and resource intensity, the matrix provides one possible approach to comparing and contrasting incubators and accelerators. Covered incubator and accelerator programs include five main types. While these types do not strictly correspond to the sponsor of that program, they do provide indicators of the source and strategic direction of that program. Types of programs assessed include:

- Corporate
- University
- International
- Independent
- Venture capital affiliated

Dozens of incubators, accelerators, and corporate innovation chiefs were interviewed across the United States for this analysis. There is no universally-accepted definition as to what distinguishes an incubator from an accelerator, even among those who are steeped in their activities. Two experienced open innovation professionals at a recent conference faced a question from the audience: "What's the difference between an incubator and an accelerator?"

"I look at it from a time standpoint. I look at acceleration kind of early on, and then incubation kind of later on," said one person.

"I think of incubators usually working with ground-up technologies, versus accelerators that may be accelerating something that's already established," said the other. "There's a little bit of a grey line."

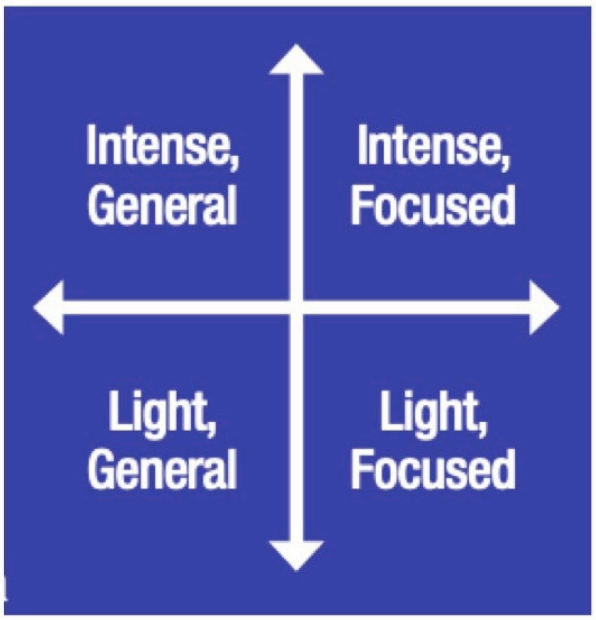

Figure 3: The Gardner-Hamaoui Matrix.

In short, experienced innovation leaders with large budgets for these activities gave the opposite responses in a public setting. For life sciences and other deep technologies defined by hardware, capital expenditure and major barriers to entry, the general guidelines between an incubator and an accelerator seems to have settled on accelerators having shorter, more formal curriculum, and incubators being associated with flexible tenancy. Even these informal lines are routinely challenged and re-shaped as the semester-length accelerator concept culminating in a pitch day has been abandoned by many operators.

Of responses from program managers, 66 percent indicated they invest in the companies they select (Figure 4). While many accelerators invest cash in the companies they select, there is not a direct correlation between programs calling themselves accelerators and the provision of capital. Among the 34 percent of respondents indicating they do not provide capital, roughly 21 percent indicated that they charge a fee, including some equity in companies selected for their program.

The majority of programs are associated with a physical space for startups, even if it is short – term and flexible space (Figure 4). Among those surveyed, 73 percent offered some form of office space, whether relocated headquarters or temporary company housing for participating startups.

Among participating programs, 44 percent offered some combination of shared equipment, prototyping, support with experimentation, and labs (Figure 4). For industries with high barriers to entry, including life sciences, electronics, aerospace, and others, these facilities

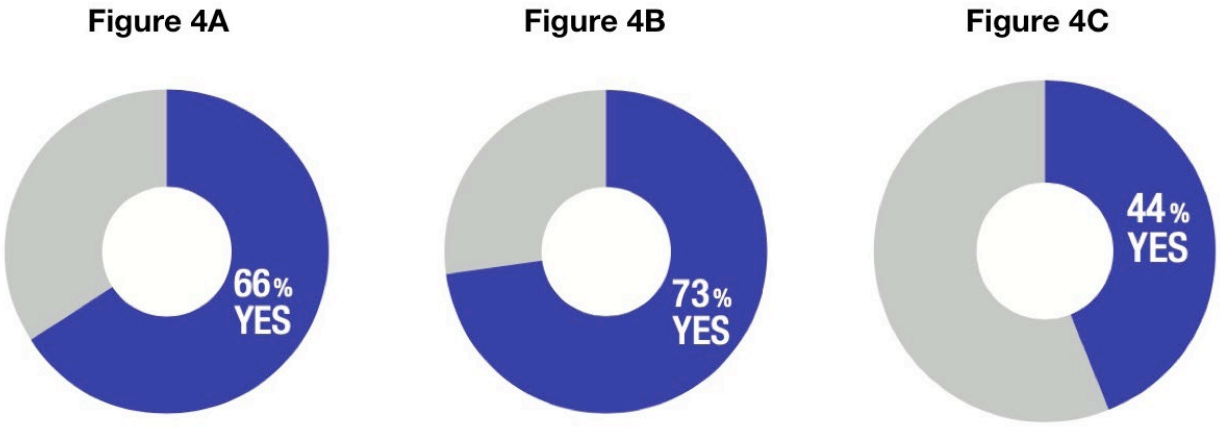

Figure 4: Percent of Programs: (**A**) Investing in Companies Accepted (**B**) With Physical Space Provided to Tenants (**C**) Providing Access to Shared Equipment.

can provide shared resources that would otherwise be totally inaccessible to startups.

The costs of research equipment for startups in biotechnology, Internet-of-Things, or transportation technologies, among other resource-heavy industries, can represent insurmountable and unaffordable conditions of product development absent an incubator to bear the expense.

A growing number of test beds and technology demonstration centers proliferated in the last decade, including for life science companies. The establishment of the California Biomanufacturing Center in 2020 included announcements about new pilot and test bed capabilities for novel equipment and bioprocessing technologies, and this new Center is not alone.[ii]

In adjacent technology industries including energy, smart cities, and IoT, demonstration projects such as Prospect Silicon Valley, GoMentum (at the former Concord Naval Weapons facility), the California Mobility Center, and the California AutoTech Testing and Development Center (at the former Castle Air Force Base) all provide critical test environments for innovators, without requiring massive capital expenditure to re-create such conditions by any individual startup.

EXPLORING NEW BUSINESS MODELS

The path to product approval in the life sciences is long and expensive. Several accelerator programs have taken approaches to product development they hope will be evolutionary steps forward.

ii The author was named founding president of the CBC in October, 2020.

INDIEBIO

IndieBio is an accelerator program in the SOS Ventures portfolio of accelerators. Their approach to developing companies includes a concerted effort to speed development. Part of the investment thesis shaping this approach is that IndieBio selects a range of companies including diagnostics and tools, materials, and other technologies beyond therapeutic biotech. The result is that their investments are strategically dispersed into companies with variations in time to market.

Acceptance into IndieBio is accompanied by cash investment of $50,000 for 8 percent equity in biotech startups followed by a $150,000 convertible note at a 20 percent discount for a total of $250,000 in funding. The five-month program operates in a fully-equipped BSL-1 and BSL-2 lab in downtown San Francisco, the birthplace of the biotechnology industry.

This program is a unique approach combining short-course, fixed-term accelerator programs with curriculum for company founders with the infrastructure that is typically part of a permanent wet lab facility. Investors at Indie Bio hope that a higher throughput of companies and the strategic spread across technologies selected for the program, can generate more promising life sciences companies on a faster track to market.

BREAKOUT LABS

A stand apart from the traditional incubator or accelerator, Breakout Labs offers up to a $350,000 grant for startups, especially in the life sciences, that are too far away from being able to raise funds from for-profit groups and too niche for traditional fundraising. Breakout Labs also

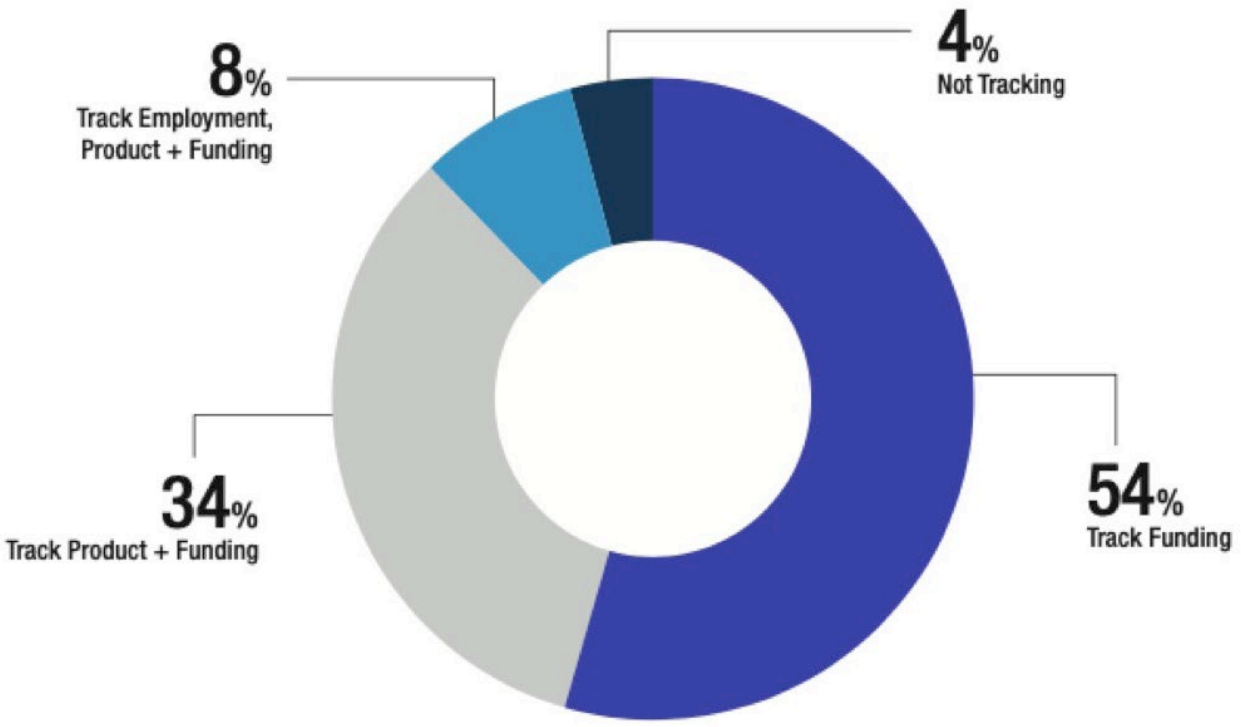

Figure 5: Measurement of Success Factors Tracked by Participating Incubators and Accelerators.

offers a two-year program of networking in the industry, exposure to potential industry partners, and strong press team to assist in generating press and publicity for startups.

Among the many unique features of Breakout Labs, the program offers no space for selected companies, and invests in companies anywhere in the U.S., regardless of location. The recent addition of Breakout Ventures may signify improved strategic value for portfolio companies. The presence of a sidecar fund could provide companies accepted into Breakout Labs with an option for expansion capital with a direct tie to the relationships they already have.

MEASURING OUTCOMES

Perhaps the most important indicator of success of a program from the perspective of entrepreneurs is the ability to raise funds or make exits, whether through some form of public offering, sale of the company, or merger. Outstanding recent examples of biotech capital raising include Perfect Day ($361 million), Pionyr ($275 million), Geltor ($114 million), Soylent ($72 million), and Clara Foods ($56 million). These are just a few examples of the graduates of programs including QB3 at UCSF, IndieBio, and Y-Combinator.[iii]

Funding is only one measure of the success of startup portfolios. Participating companies make other kinds of measurable progress. Some programs track product milestones, employment changes, new markets entered, and more (Figure 5). Almost all responding programs affirmed that they track funding events of portfolio companies, and many go further.

Some 54 percent reported they track funding, and 33 percent track product milestones as well as funding. Eight percent reported that they track both of those for successful graduated companies, as well as the growth or change in headcount of portfolio companies. Only 4 percent indicated that they are not tracking successes of graduated companies.

Incubators and accelerators also drive economic activity by their own direct investments. Operating any of these programs requires space, personnel, and often the kind of capital equipment that is beyond the reach of typical startups. To assess direct investments made by programs, the California Business Incubation Alliance

iii Funding rounds sourced from Crunchbase, discounted not to include pharma partnering dollars in future potential earnings, https://www.crunchbase.com/home.

surveyed approximately 50 programs regarding their annual spending activities.

Among respondents, the average for annual internal spending on staff, space, equipment, and consumables totaled $439,000. Many represented small businesses themselves, with an average of less than ten employees.

Life sciences programs face some measurement challenges in the value of their contributions to entrepreneurs, as well as their own spending to generate economic impact. Programs surveyed for California Tool Works replied that more than $50 million dollars in research equipment had been donated or acquired on a deeply discounted basis from companies making changes or closing. Impacts such as these, representing the strength and connectivity of an entire ecosystem, were beyond measure.

SUMMARY AND CONCLUSIONS

In certain ways, incubators have helped fill the "valley of death" in terms of both capital and product development for life sciences entrepreneurs. By providing subsidized space in smaller floor plates and on more flexible terms than possible in conventional commercial real estate, incubators extend the capital efficiency of and contribute to the survival and potential success of life science startups. The majority of programs directly invest in startups they accept, furthering the contribution.

Meanwhile, the tremendous growth in all accelerator programs in California and nationally has been matched by dramatic growth in programs with a life sciences focus. The California programs surveyed have supported the growth of more than 100 companies which attracted well over $800 million in risk capital in the last five years.

In general, the growth of incubation options represents more opportunity and more variety available to entrepreneurs in need of flexible space to develop their first products. Simultaneously, the public's interest is served by the lasting economic impacts from incubation in research-intensive industries.