

## Article

# Thought Leader Insights on Innovation Ecosystems And Clusters

Moira A. Gunn

Director of Bioentrepreneurship, and Associate Professor, College of Arts and Sciences, University of San Francisco

## ABSTRACT

This article provides short, “book reviews” and selected comments on recent, popular books that focused on ecosystems and clusters. They include: AnnaLee Saxenian (reflections and lessons from “Regional Advantage”; Leslie Berlin (the building of Silicon Valley from “Troublemakers”); Richard Florida (reflections and extensions of “The Creative Class”); and, Greg Horowitz (lessons from “Rainforest”).

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## INTRODUCTION

**T**HE INITIAL IDEA for this contribution was simple: Would it be valuable to consider a complement of proven entrepreneurship books for this special issue on innovation ecosystems and clusters? Solid books on entrepreneurship move our thinking, re-orient us in time and space, and give our motivations new life. And the very effort of reading an entire book asks us to think more deeply about the human dynamic of entrepreneurship.

Still, some dismiss general entrepreneurship books as inapplicable to the business of biotechnology, and there is clearly a point to be made here. Intentionally needing to pressure emergent science and/or developing unprecedented, while dependable, technologies does not make for a predictable path to success. With biopharmaceuticals requiring 12-15 years from lab bench to FDA approval and \$1B-\$2B of funding, or more, to achieve approval, it's difficult to argue that these are not exceptional circumstances. And yet, whether it's biopharmaceuticals, or relatively less resource-intensive efforts, such as biomedical devices, diagnostics, or BioIT analytics-in-the-cloud, or potentially even greater resource-intensive efforts, as is the case for new vaccines, whose development and deployment are potentially changing permanently before our eyes ... make no mistake, all of these efforts exist within an entrepreneurial dynamic. Could more general entrepreneurship concepts apply?

Do they translate to innovation ecosystems for building biotech enterprises? Or don't they?

Harvard Business School Professor Gary P. Pisano's viewpoint saw no essential differences between the challenges of biotechnology businesses and those of Silicon Valley in the areas of semiconductors, computers, and advanced materials. In his seminal 2006 book, *Science Business*, he states: “The science-based business actively participates in the process of advancing and creating science”, emphasizing that each needs to push the boundaries of science to be successful.<sup>1</sup> Whether high tech or high bio, these innovative businesses are intent on creating new and disruptive products, and this requires new science. Tracing the roots of the Silicon Valley electronics industry to the founding of Fairchild Semiconductor in 1957, Dr. Pisano cautioned that this two-decade head start must be considered when attempting to compare the maturity of the two industries. Marking the biotechnology industry's launch of Genentech in 1976, in 2006, he writes: “We are still very much in the learning phase.”<sup>1</sup> One benchmark for this perspective might be that at the time of his book's publication, whole genome testing cost \$300,000, while today, it costs several hundred dollars.<sup>2</sup> Yet, these specifics beg the question: What hasn't changed? In both high-bio and high-tech? Arguably, the continuous need for evermore groundbreaking science and continuous disruptions in technology.

The sheer complexities of the challenges in both fields, and the collective minds required to address them, speak to the necessity of functioning innovation ecosystems and clusters. From concept to every step in the innovation journey, through to market entry and full operation, these ecosystems must be active and working at every level. This starts with individual contributors

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Correspondence:

Moira A. Gunn [gunn@usfca.edu](mailto:gunn@usfca.edu)

and extends to teams, and groups, and every organizational unit up through the entire enterprise, as well as its positioning within the total ecosystem in which it exists. When considered in these terms, bioenterprise may be no different from any highly innovation-driven enterprise, and the perspectives of general entrepreneurship may provide real value.

The next challenge became “Which books?” To simply pick the bestsellers from last year tends to harvest the trends in current thinking, while selecting books published over time brings other problems. For example, these books reflected the times in which they were written or last revised; changes in technology and advances in science can be disruptive on many levels. And our ability to contrast and compare them is impeded by our own personal experiences, which are set against the backdrops of all the breakthroughs in science or technology which occurred in the interim. And while many start-ups can be traced to one or a few interconnected individuals, we are today experiencing a massive *collective, multi-organization pivot*, due to COVID-19. Recent pre-COVID perspectives may already be outdated, just as perspectives offered prior to ubiquitous mobile technology, DNA-on-demand, and instant global communications may need re-interpretation.

Yet ... does entrepreneurship necessarily change? As new scientific or technological capabilities are made possible? It is the unprecedented capability of the individual human brain, and humans working together, which drives innovation in the end. And humans are still humans.

In keeping with this issue’s focus on innovation ecosystems and clusters, five best-selling books by five authors are presented here to give the reader some insight into what each offers. Whether a new bioentrepreneur or an experienced one, the challenge before you appears to be in constant flux. Some operate within a sparse innovation ecosystem, either bound by geography or by the lack of the “right” scientific expertise. Others innovate within an ecosystem-rich environment, yet somehow find themselves acting in isolation. And for any entrepreneur, there are those who must create their own innovation ecosystem, among a myriad of other possibilities.

All authors were able to make original contributions to this article. Interviews (either written responses or via Zoom) were conducted with regard to changes which have taken place since publication of their books with authors AnnaLee Saxenian, Victor W. Hwang and Greg Horowitz. Silicon Valley historian Leslie Berlin made the argument for studying history in the innovation context. Richard Florida’s 2019 book revision reflects his most up-to-date statistics and insights, yet he added his latest research efforts into the impact of COVID-19 on cities.

## THE BOOKS

**Author:** AnnaLee Saxenian

Professor, School of Information, UC Berkeley

Formerly, Dean, School of Information and Professor, City and Regional Planning

**Two Books:** *The New Argonauts: Regional Advantage in a Global Economy*<sup>3</sup>

Harvard University Press, 2006

*Regional Advantage: Culture and Competition in Silicon Valley and Route 128*<sup>4</sup>

Harvard University Press, 1994

UC Berkeley Professor AnnaLee Saxenian has studied the dynamics, limits and potential of innovation regions for decades. In 1994’s *Regional Advantage*,<sup>4</sup> Saxenian analyzes and compares the two regions which drove the electronics industry in the 1980’s: the long-established Route 128, enabling businesses to centrally arc around Boston, all some 15 miles away, and Silicon Valley, just south of San Francisco, officially the Santa Clara Valley, which prior to the emergence of the electronics boom was the world’s largest producer of fruit and fruit-packing. This book can now be read at arm’s length: What are the elements that foster innovation? What is the impact of one region massively losing technological resources to another? What can be duplicated, what can be avoided, and what must be grown organically? The deep and unexpected interest which the Japanese showed in this book post-publication recognizes the perceived value of innovation ecosystems and clusters.

In her successor book, 2006’s *The New Argonauts*,<sup>3</sup> Professor Saxenian examines the effect of engineers moving to Silicon Valley from all points in the globe and their multi-cultural, multi-regional experience at a time where all technology is global technology. The ecosystem of Silicon Valley became more a reflection of the world’s capabilities than a locally-staffed entrepreneurial region. The challenges of transitioning the non-U.S. engineer’s experience and expertise back to their home countries is explored, with primary emphasis on China, India, Taiwan and Israel.

Since this time, there has been great interest in the effect and success of “returning entrepreneurs” to their home countries – the so-called “sea turtles”, who usually return to the beach where they were born to nest. More recent research includes analyses of success of these home country returns,<sup>5-6</sup> their incorporation with respect to newly-created science parks,<sup>7</sup> and a new (2020) literature review with respect to returning entrepreneurs.<sup>8</sup>

## 2020 INSIGHTS FROM ANNALEE SAXENIAN:

Professor Saxenian cites three important changes since the publications of both books: corporate size distribution, a backlash against technology companies leading to new regulations, and the US-China business environment. She also provides her perception of the impact of the COVID-19 Pandemic.

**Corporate Size Distribution:** “With the Internet and the web, the growth of a handful of giant tech corporations that have disrupted the prior patterns of *size distribution*. In the past there were lots of small and mid-sized firms, and big companies rose and fell regularly—but Google, Facebook, and Apple have been dominant for longer and seem positioned to persist due to resources, scale, political clout. They’ve also undermined competition through acquisitions — and over longer haul could threaten startup ecosystem. (But we’re not there yet.)”

**Tech Backlash Leading to New Regulations:** “[T]he backlash against tech and [the] push for regulation is new—antitrust, privacy protection, risks of misinformation, concerns about addiction, surveillance and control of data, etc. This level of political scrutiny is new.”

**The US and China:** “US-China relations have deteriorated significantly under Trump, threatening patterns of immigration, the transnational communities, investment flows and knowledge exchange that were essential to The New Argonauts. China and the US may come to be separate spheres for internet, technology, and trade.”

**The Impact of the COVID-19 Pandemic:** “With respect to the COVID situation, it seems the pandemic has further strengthened the position of tech giants because they are fully online — so they remain accessible to customers, and work from home doesn’t hurt their processes (the way it would in other industries) — at least in short term.”

**Author:** Leslie Berlin  
Project Historian, Silicon Valley Archives  
Stanford University

**Book:**  
*Troublemakers: Silicon Valley’s Coming of Age*<sup>9</sup>  
Simon & Schuster, 2017

Here we get to the personal stories, as only an historian would tell them. A Project Historian with the Silicon Valley Archive at Stanford University, Dr. Berlin interweaves many stories of what might be termed the adolescence of Silicon Valley. Perhaps proving Professor Pisano’s insights regarding the intrinsic importance of both the electronic and biotechnology industries to Silicon Valley, Berlin includes the beginnings of

Genentech, venture capitalist Bob Swanson, UCSF professor Herb Boyer, Stanford professor Stanley Cohen, and others. The question of what makes intellectual property in the biotech space was a true open question, and it was also a time when venture capitalists were, in a sense, just learning to be venture capitalists in these high risk environments. The result is an insight into how innovation ecosystems are born, reminding us that even the ecosystem itself is a product of innovation. Entrepreneurs will likely see themselves in many of these personalities and situations – biotech and otherwise.

## 2020 INSIGHTS FROM LESLIE BERLIN:

**The Import of Studying the History of Innovation:** While Silicon Valley Archive Project Historian Leslie Berlin continues to study, provide comment on, and identify and acquire new Silicon Valley innovation archival material, she clearly states: “With the importance and pace of breakthroughs only continuing to rise, it’s more important than ever to study the history of innovation and the people who innovate.”

**Authors:** Victor W. Hwang and Greg Horowitz  
Victor W. Huang  
Founder & CEO, Right to Start  
Former Vice President for Entrepreneurship, Kauffman Foundation  
Co-Founder & Former CEO, T2 Venture Capital  
Greg Horowitz  
Director of Innovation  
University of California, San Diego (UCSD)  
Co-Founder & Managing Director, T2 Venture Capital

**Book:**  
*The Rainforest ... The Secret to Building the Next Silicon Valley*<sup>10</sup>  
Regenwald, 2013

*The Rainforest* speaks directly to the innovation ecosystem, writ large and small. Authored by two long-time Silicon Valley venture capitalists and entrepreneurs in their own right, it proposes that Silicon Valley – and all innovation ecosystems – might be envisioned as a living and dynamic tropical rainforest. Well considered and insightful, it reminds us that venture capitalists are more than just providers of the funds necessary to bring an enterprise to fruition. Venture capitalists are also coaches, constantly on the lookout for what could go wrong within an enterprise. They also look for what is going right, and why. This includes human behavior and what motivates

us, good vs. less-than-optimal motivations, what makes for a fair vs. unfair deal, and why we should care. The culture of an enterprise as it relates to the larger ecosystem is considered, as well as how to measure the health of something as changeable and organic as a rainforest. Rules and Tools are presented throughout. Not a long read, but a smart one. You might be tempted to scan past the bullet points. Don't. Each bears consideration, and there is that one essential chapter for all: How to Build a Rainforest.

## 2020 INSIGHTS FROM VICTOR W. HUANG:

**The Legacy of Silicon Valley:** “*The Rainforest* was inspired by the valley, but the concepts can apply towards prosperity anywhere for anyone in any community. Someone once asked me, ‘Is that going to be the greatest legacy that Silicon Valley leaves?’ I hope so, because it’s not just about an iPhone or a website. It’s around a conceptual model of how you create prosperity. That, to me, would be the best legacy. I’ve seen small towns, rural areas, underserved communities – they’ve all taken parts of this work, and they’ve made it their own. There’s something about this universality that’s really interesting. Especially where there’s so much disruption to so many communities, where big companies have done well, and little companies have struggled. We actually think about reinventing an economy, helping lift up the voices that are forgotten from the little innovators and entrepreneurs.

**Individuals Innovating from Their Own Homes:** “I think what our leadership hasn’t fully grasped is that the Internet has changed the ability to create economic value. It used to be, not that long ago, that corporations were corporations, and people were people. You have people now that can do what only large corporations could do [only] a decade or two ago. People have the power to build their own supply chains, their own manufacturing process, their own marketing channels, and to do it in their pajamas from their bedrooms. That was not possible a decade or two ago – now everyone can do it.

**Evolving Business Models:** “[This calls] into question all of the models around Who’s a worker? Who’s a company? Who’s an employer? Everyone can be a creator. Everyone can be an employer and employee, at the same time. But what does our economic and governance system look like? I think that’s the shift we’re having to make right now, and it’s a great one, because it means we can distribute value creation everywhere. Everyone can find solutions to problems, but we don’t teach [how to] do it and we don’t help people with it. We don’t have a system that’s makes it easy to do that. So that’s the opportunity

now is to really democratize the means of innovation and capitalism for everybody in a way we just haven’t done.”

**Current Technical Tools:** “You look at the technological tools now. They’re used to actually serve bad ends: To create addiction, to help drive clicks for things that we don’t need and to drive want and desire, where we actually don’t get value from things. You can actually take those same tools that technology has taught us around how to direct people’s attention and apply it now towards actually creating things, building ecosystems, building relationships to drive problem solving. I think there’s huge opportunity, but we’ve got to realign the way we operate our economy to do it.”

**New Capital Funding Models:** “One of the things we did at Kauffman is we actually invested into capital formation. So we actually built a fund to create funds that are innovative, addressing underserved markets. That’s actually a lesson you can take from places like Israel. Israel is known for being the most prolific venture capital industry in the world, per capita. What people don’t realize is that [its] venture capital industry was built in large part by a government sponsored “fund of funds”, that, is a fund that helped create other funds. And that that fund has returned itself, many times over. And it was the model that actually built Latin America’s venture capital industry, called the Multilateral Investment Fund, which was modeled off of Israel and has sponsored over 100 funds in Latin America. You can take that same basic model and build capital in all sorts of markets across the US, but no one has done that. There’s a huge opportunity to create that kind of mechanism here.”

**The Impact of the COVID-19 Pandemic:** “I think COVID is a great proof point regarding individuals working from home. New businesses are bursting everywhere. We haven’t built a system that really recognizes and respects that, and I think that’s the opportunity we have right now. We have a real opportunity here to reinvent the economy. Most people don’t see it yet ... but it’s right there.”

## 2020 INSIGHTS FROM GREG HOROWITT:

**Thoughts Since the Book’s Publication:** “Between the time we finished *The Rainforest* and now, I always talk about how the future is going to be in these ‘digital’ rainforests, as well. A lot of governments, when you talk about innovation, per se, you’re seeing places like Singapore and Israel that have dominated in their own way, their innovation landscape is proportionate to their geography. What I’ve been doing lecturing and writing about is this concept of ‘digital’ rain forests and how we interact and how we connect our physical bodies to these digital

realities. What are the new tools, and how do we navigate and create impact well beyond our physical limitations.”

**The Impact of the COVID-19 Pandemic:** “One of the hallmarks of true innovation is serendipity. So, when you looked at our book we talked about the engineering process because in the rain forest, it’s about the engineering of environments and basically the entering of serendipity. It’s about increasing the collisions and randomness. So, even on a campus where we now have to study at home versus being on campus. One of the greatest values of the college experience for many are the social constructs that they develop bumping into one another. It’s the bad judgment that gets exercised that eventually leads to better judgment. It’s the social experiences, and that’s what’s being missed. So, innovation, in the time of COVID, is we have to somehow replace that. So some of the new tools can embrace the virtual tools. They’re not directly placements, and they never will be, because human beings still need human interaction, which includes social cueing, looking at someone’s eyes. It’s a very human thing.”

**Author:** Richard Florida  
University Professor, School of Cities and Rotman School of Management  
University of Toronto  
Distinguished Fellow, New York University, Urban Lab

**Book:**  
*The Rise of the Creative Class (Paperback, Illustrated)*<sup>11</sup>  
Basic Books, 2019

Professor Richard Florida has written a number of best-selling books, including *The Flight of the Creative Class*, which projects the global competition for talent. While that may seem to be the most relevant book here, his first book, *The Rise of the Creative Class*, most recently revised in 2019, speaks directly to people working in cities, both in the United States and globally. This particular year for a revision was opportune, as it records the data immediately prior to the COVID-19 pandemic.

While the trend of movement into urban settings has been definitive and substantial until the start of the pandemic, it was instantly disrupted by the requirement to work from home. Where workers will be living in the post-COVID era remains to be seen, the details regarding numerous cities within the United States, the global reach of creative workers, and qualifying the quality of places to live and work remains extremely informative. Has a person who lived in the hip and dense Mission District of San Francisco, but has now moved to a nearby suburb within the San Francisco Bay Area, actually left the region? Suburbs were once viewed as adding commute but, now, reducing density and expense. The habits

and needs of the “creative class” within the United States bear significant examination while planning for the post-COVID era.

## 2020 INSIGHTS FROM RICHARD FLORIDA:

**The Impact of the COVID-19 Pandemic:** Professor Florida’s extensive research on urbanism has pivoted significantly during the COVID-19 Pandemic. He has either personally written or been significantly referenced on this topic in some sixty mainstream publications since March, 2020, as of this writing.

In the October 14, 2020 edition of the *Financial Times*’ “From peak city to ghost town: the urban centres hits hardest by COVID-19”, footfalls, in terms of the number of people who entered retail or leisure spaces, cited Manhattan, San Francisco and Los Angeles as having 43%, 46% and 70%, respectively, of pre-COVID levels, as measured during the week of October 9<sup>th</sup>.<sup>12</sup> Among other comments, Dr. Florida provides this insight: “The pandemic is not only going to reshape cities but it’s going to reshape suburbs and rural areas”; further, bringing the significant base of digitally-supported workers together in high-rise city towers may be perceived as “the last gasp of the industrial revolution”.<sup>12</sup>

Globally, at the other end of the economic spectrum, but also, with no escape from COVID, Professor Florida, with co-author Robert Muggah, published “COVID-19 will hit the developing world’s cities hardest. Here’s why” in May, 2020 on the World Economic Forum’s COVID Action Platform.<sup>13</sup> Considering the impact of infectious disease, specifically COVID-19, the authors point out that “mega-slums are incubators of disease transmission”, while “60% of the world’s labour force works in the informal economy”.<sup>13</sup> This makes “the notion of ‘shelter-in-place’ preposterous”.<sup>13</sup>

With the experience of the COVID-19 Pandemic, such insights demand a larger vision for the biotechnology industry, well beyond those target markets which return investment. Multi-national clinical trials have become routine, even while those markets may not be lucrative for the ultimate product. *ClinicalTrials.gov*, maintained by the U.S. National Library of Medicine at NIH, reports 350,497 clinical trials underway in 219 countries.<sup>14</sup> The successful development of biopharmaceuticals, diagnostics, biomedical devices, etc. may require a greater horizon in the face of pandemic-level infectious disease.

A complete list of media relating to Professor Florida and his work regarding the impact of COVID on urban areas can be found at <https://covidcities.com>.

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