

## Technology Strategy (MGMT 731)

Karl T. Ulrich

Definition of technology

Roles relative to technology

What is a technology strategy?

Incremental vs. radical innovations / H1, H2, H3 innovation

S-curves

Technology push and market pull

Drivers of diffusion rates

Rogers' categories of adoption / "crossing the chasm"

Industry patterns of entry/exit and the "dominant design"

Competence-enhancing vs. competence-destroying technologies

Disruption of incumbents - disruption from below and the "innovator's dilemma."

Drivers of value capture - appropriability and complementary assets

Patents as mechanism for appropriation

Standards as mechanism for appropriation

Timing of entry, first mover "advantage"

Open innovation, open tournaments

Make-buy decisions in innovation, establishing an innovation frontier

Technology ecosystems

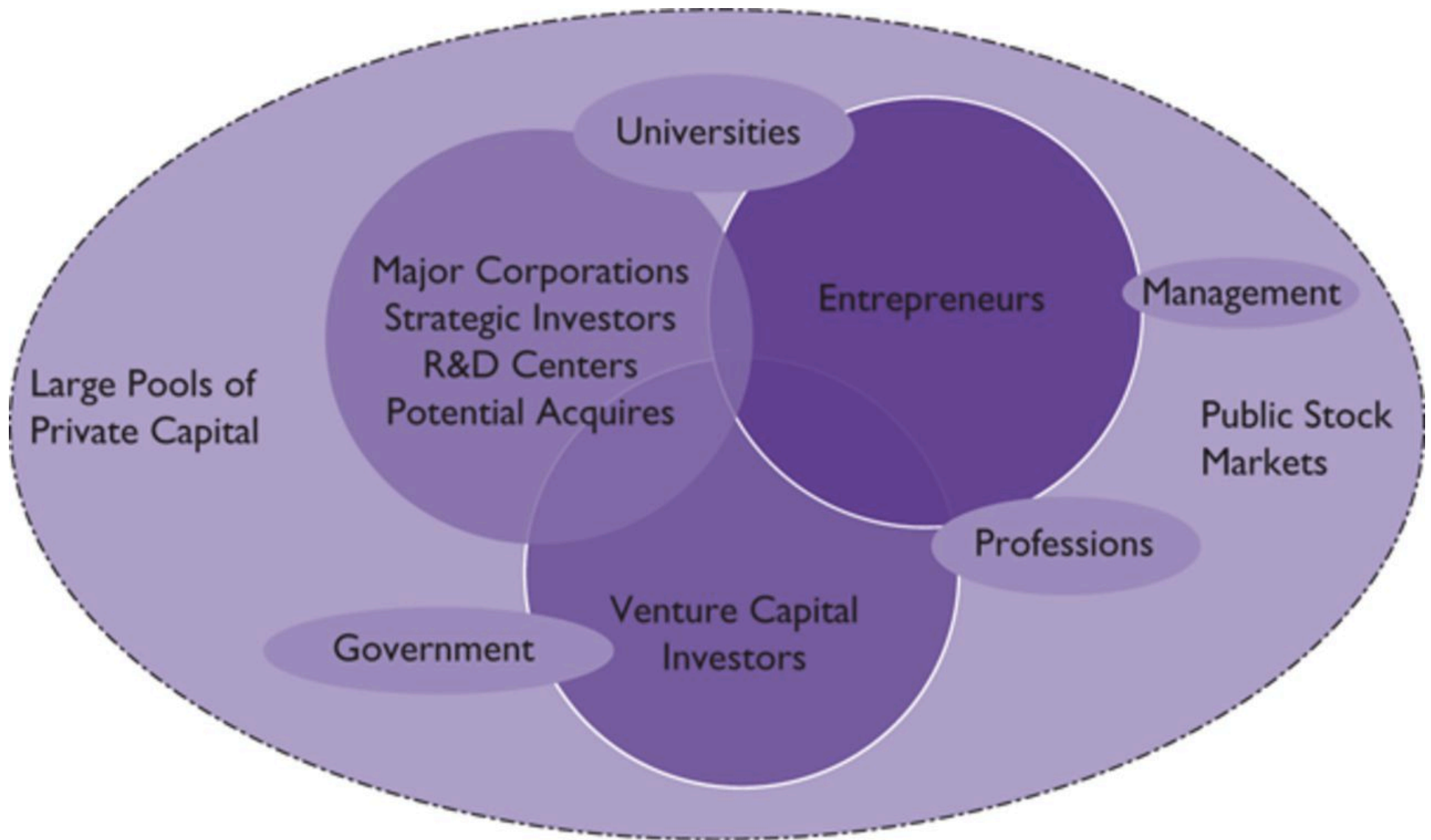
Technology and society

**Session 4: Technology**

Ecosystems, Universities, &  
Wharton



# Innovation Clusters



# Explaining Silicon Valley

- Heavy government spending during the Cold War (1950 – 1970).
  - National labs
  - Defense contractors
- Open collaboration between Stanford and industry (Terman policies >1951).
- Invention of semiconductors -- once-a-century technological discontinuity.
  - Fairchild, Intel, and offspring
- Individuals like living in California.
- California labor laws – highly favor employee mobility.
- Culture of mobility, cooperation, optimism. (Legacy of Gold Rush? Selection bias of immigration?)
- Instructive analogies:
  - San Diego – Biotechnology
  - Boston / Route 128 – what happened?
  - Shenzhen, Taiwan, Singapore – other types of clusters

...but, highly path dependent, and an organic system that is self-reinforcing.

**Good summary article (on Canvas):** Jerome S. Engel, “Global Clusters of Innovation: Lessons from Silicon Valley, California Management Review . Winter 2015, Vol. 57 Issue 2, p36-65.





2014 SSF

## Goals for Wharton San Francisco

- Exploit the **distinctive advantages of our San Francisco** location to **lead in entrepreneurship and innovation** globally.
- Further build a **vibrant student and alumni community** in the Bay Area.
- Integrate our San Francisco activities into ***one Wharton***.
- **Off-load administration** of Hills Brothers facility so **programs can focus** on achieving excellence.

## Approach

1. Standing **faculty lead**. Karl Ulrich is responsible for Wharton San Francisco as a key element of the Dean's strategy for preeminence in entrepreneurship and innovation.
2. Make the **facility a bustling hub of student and alumni activity**.
3. **Expand our programs** for FT MBA, UG, and Exec Ed activities in San Francisco, building on our success with WEMBA.
4. Create a new **Shared Services** unit to run facility and free programs to focus on program excellence. Shared Services is led by Brandon Lodriguss, Director of Operations | Wharton San Francisco.

## Focus on Programs (plus...)

**WEMBA SF**  
(Bernie Birt  
and team)

**FT MBA**  
Program  
(Marie Halpern  
and team)

**Wharton**  
**Entrepreneurship**  
(Irina Yuen  
and team)

Executive  
Education  
(Steve Miller  
and team)

UG Program  
(future...)

**San Francisco Shared Services** (Brandon Lodriguss)  
*Facility, Computing, Reception, Events, Finance & Administration*

**Bay Area Alumni Engagement** (with Alumni Relations)

**Bay Area Wharton Brand Development** (with Wharton Marketing & Communications)

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Wharton  
UNIVERSITY of PENNSYLVANIA

# Entrepreneurship

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Kunal Bahl,  
Wharton Undergrad '06, Engineering BSA'06

## INDIA'S LARGEST ONLINE MARKETPLACE



**WHARTON  
ENTREP**

Enabling Entrepreneurship at Penn

### Knowledge for Action

- > Build real businesses & create jobs for an enlightened global economy
- > Access the very best international business network
- > Accelerate your journey to success

### Entrepreneurship Blog →

Sep 22, 2015

Dancing in the Madness



### Tweets

[Follow](#)

WhartonEntrepreneurs @WhartonEntrep 37m  
Did you miss our #Entrepreneurship Expo? Get the experience in just 1 minute from this video:  
[bit.ly/1gRIQW7](http://bit.ly/1gRIQW7)

Show Media

### Penn Students →

All schools,  
all levels  
are invited  
to participate










# Wharton Entrepreneurship

- Dozens of programs (e.g., business plan competition, venture initiation program)
- Approximately 3000 student points of contact each year.
- Staff of 25 – 30 in Philadelphia and San Francisco.
- “Top 3” position among business schools in terms of alumni entrepreneurial activity.





# PitchBook TOP 25 MBA

|   |   |                    | entrepreneur count | company count | capital raised (\$M) |
|---|---|--------------------|--------------------|---------------|----------------------|
| 1 |    | Harvard            | 557                | 497           | \$6,746              |
| 2 |    | Stanford           | 394                | 341           | \$4,077              |
| 3 |    | U. of Pennsylvania | 327                | 285           | \$4,084              |
| 4 |   | MIT                | 219                | 190           | \$3,366              |
| 5 |  | Northwestern       | 211                | 194           | \$2,273              |
| 6 |  | Columbia           | 186                | 174           | \$1,267              |
| 7 |  | INSEAD             | 185                | 165           | \$1,936              |

**Source:**  
Pitchbook  
Universities Edition  
2015-2016

# Key Opportunities / Challenges

1. Clear and inviting **starting point and pathways** for all Penn students interested in entrepreneurship.
  - Courses
  - Co-curricular activities
2. Increased capacity and quality of **co-curricular resources** for students.
3. **Excellent facilities** for active learning and co-curricular activities.
4. Enhanced vitality of the **alumni network**.
5. **External recognition** of preeminence in entrepreneurship.





# 1. Re-Branding Wharton Entrepreneurship as “Penn Wharton”



Enabling Entrepreneurship at Penn

*As with Penn Wharton China Center...*



PENN WHARTON  
CHINA CENTER  
宾大沃顿中国中心

## Why Penn Wide?

- Entrepreneurship is done by multi-disciplinary teams.
- Connect entrepreneurship to technological innovation and advances in science.
- Provide a “start here” button for any Penn student.

## Why Wharton Led?

- Deep faculty expertise in entrepreneurship (30 +/- faculty).
- Wharton is willing and able to generate funding.
- Wharton graduates lead many successful startup, tech firms and VC (e.g., Google, Tesla, LinkedIn, Warby Parker, Zynga, First Round Capital, Union Square Ventures).

# Partial Inventory of Penn Entrepreneurship Activities

Business Radio shows *Launch Pad*, *Digital Hour*, *Innovation Navigation*, *Bay Area Ventures*, ...

Semester in San Francisco

Student clubs and conferences (e.g., Founders, Entrep, Tech, etc.)

Wharton Venture Initiation Program

Wharton Entrepreneur in Residence Program

Goergen Entrepreneurial Management Program

Wharton Small Business Development Center

Wharton Innovation Fund

Wharton San Francisco

Wharton Social Impact Initiative

Y-Prize (joint with SEAS)

Wharton Executive MBA Alumni Venture Fund



Detkin Intellectual Property and Technology Legal Clinic

Engineering Entrepreneurship Program

iDesign Prize

Integrated Product Design Program (MS program admin by SEAS with Wharton and Design School)

Larger Philadelphia ecosystem: e.g., Dorm Room Fund, Science Center, DreamIt Ventures.

Milken-Penn GSE Education Business Plan Competition

Nursing School Health Technology Innovation Incubator

Penn Biotech Group Entrepreneurship Division

Penn Center for Innovation – tech. transfer, Southbank facilities, Upstart program, iCorp

Penn Law Entrepreneurship Legal Clinic

Penn Medicine Innovation Center

PennApps Hackathon

Social Impact House (Center for High-Impact Philanthropy)

Weiss Tech House



## Institute for Entrepreneurship

### DISCOVER



Penn Research  
Penn Center for  
Innovation

Commercialization  
Workshops

Weiss Tech House  
PENNApPs

### LAUNCH



#### **Penn – Wharton Venture Lab**

- Courses
- Business Plan Competition
- Venture Initiation Program
- Entrepreneur in Residence
- Impact Labs

### SCALE



#### **Wharton Scale School**

- Workshops
- Analytics Initiative
- Online courses

### GROW



#### **Mack Institute**

- Design challenge
  - Partners program
- PCI – Tech. Licensing  
Career Management

**NB:** “venture lab” is a working name...  
others under consideration.



## 2a. Create an Iconic Facility for Student Entrepreneurship





# Proposal Under Development for The Rotunda (40<sup>th</sup> and Walnut)



*addition and plaza on Walnut*



KSS ARCHITECTS

Project No. 22252 | October 06, 2015

[kssarchitects.com](http://kssarchitects.com)

Photo courtesy of the University of Pennsylvania Archives and Records Center





*main-level student spaces – “the street”*





*upper-level colloquium and co-working space*



# Rotunda Project

- 40<sup>th</sup> and Walnut (adjacent to Bridge Cinema).
- 40k sq-ft +/- (with proposed addition).
- \$20mm +/- capital required.
- Key elements:
  - Colloquium space for events.
  - Co-working space 24/7.
  - Reservable team rooms, conference rooms, board room
  - Maker lab (2500 sq-ft 3D printing, laser cutting; run by SEAS).
  - Incubator pods for student ventures.
  - Active learning classroom.
  - Faculty & mentor “office hotel.”
  - Staff offices.



## 2b. Student and Alum Co-Working Space in San Francisco, New York (...and hopefully Beijing and London)





# 3. Rationalize the Curriculum

## REQUIREMENTS FOR THE ENTREPRENEURIAL MANAGEMENT MAJOR

The major consists of a total of 5.0 credit units, one of which is a part of the first-year Management Core. Only 1.0 cu of pass/fail coursework can be counted towards the major.

**a) One credit unit (1.0 cu) of the Management Core (any combination of Management core courses up to a maximum of 1.0 cu)**

**b) MGMT 801: Entrepreneurship (0.5 cu) is required for the major and cannot be waived or substituted. Students are recommended (but not required) to take this foundation course before the elective courses listed in section 'c' below.**

**c) Three and a half credit units (3.5 cu) of the following:**

FNCE 750 Venture Capital and the Finance of Innovation  
HCMG 866 eHealth: Business Models and Impact  
HCMG 867 Health Care Entrepreneurship (0.5 cu)  
LGST 813 Legal Aspects of Entrepreneurship  
MGMT 731 Technology Strategy (0.5 cu)  
MGMT 766 Family Enterprise Management  
MGMT 801 Entrepreneurship (0.5 cu)  
MGMT 802 Change, Innovation and Entrepreneurship (0.5 cu)  
MGMT 804 Venture Capital and Entrepreneurial Management (0.5 cu)  
MGMT 806\* Formation and Implementation of Entrepreneurial Ventures  
MGMT 809 Private Equity in Emerging Markets (0.5cu)  
MGMT 810\* Social Entrepreneurship  
MGMT 811 Entrepreneurship through Acquisition (0.5 cu)  
MGMT 816 Building Human Assets in Entrepreneurial Ventures (0.5 cu)  
MGMT 833 Strategies and Practices of Family-Controlled Companies  
MGMT 893\*\* Advanced Study Project in Entrepreneurial Management (0.5 cu or 1 cu)  
MGMT 899\*\* Independent Study in Entrepreneurial Management (0.5 cu or 1 cu)  
MKTG 741 Entrepreneurial Marketing (0.5 cu)  
MKTG 890\*\*\* Global Consulting Practicum (only 1.0 cu can count toward the major)  
OPIM 614 Managing the Productive Core of the Firm: Innovation (0.5 cu)  
OPIM 651 Innovation, Problem Solving, and Design (0.5 cu)  
OPIM 654 Product Design and Development (0.5 cu)  
OPIM 662 Enabling Technologies  
REAL 891 Real Estate Entrepreneurship (0.5 cu)

\*MGMT806 and MGMT810 apply a common theoretical framework to businesses with differing value propositions; therefore, students should not plan their course of study to include both of these courses.

\*\*Needs approval by the department.

\*\*\*Only 1 cu of MKTG890, Global Consulting Practicum, can be counted toward the major and needs approval by the department.

**d) Optional: a maximum of one credit unit (1.0 cu) of the following courses may be substituted for 1.0 cu of elective courses listed under (c) above:\***

FNCE 751 Finance of Buyouts and Acquisitions  
MGMT 691/OPIM 691/LGST 806 Negotiations  
MGMT 721 Corporate Development: Mergers & Acquisitions  
MGMT 773 Managing Organizational Change  
MKTG 721 New Product Management (0.5 cu)  
MKTG 724 Advertising Management (0.5 cu)  
MKTG 712 Marketing Research  
MKTG 777 Marketing Strategy

\*Only 1 cu of Advanced Study Project including Global Modular Courses may count towards the Goergen Entrepreneurial Management elective requirements stated in (d) above and must have approval from the department.

Students may petition to substitute other courses (including INSEAD and other exchange program coursework) toward the requirements of the major. Such requests will be expected to demonstrate that the student is pursuing a coherent plan of entrepreneurial management studies at Wharton. Petitions should be sent in writing to the Entrepreneurial Management academic advisor, Nellie Gaynor at [nelliebk@wharton.upenn.edu](mailto:nelliebk@wharton.upenn.edu). Other courses cannot exceed 1.0 cu equivalent of Wharton coursework.

### Key Opportunities

- Less redundancy.
- Better instruction.
- Greater access for Penn students.
- Logical pathways.
- Departmental politics invisible to students.
- Play nice with other Schools at Penn.

## 4. Strengthen the Alumni Network, particularly in Bay Area

Connect the connectors  
and provide tangible  
benefits to Wharton alumni  
status.

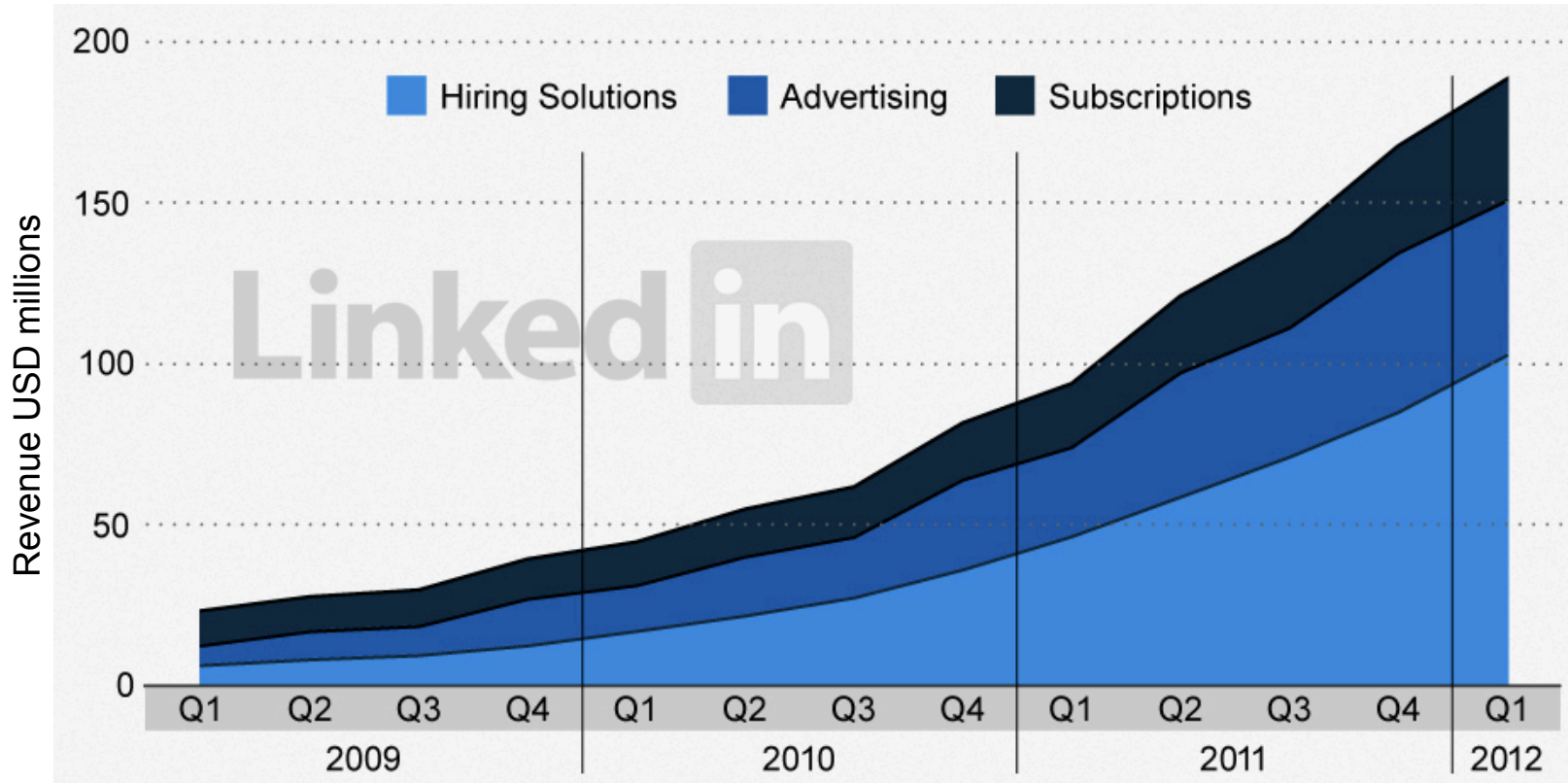


### Immediate Actions

- 24/7 Access to Wharton SF facility as meeting/co-working. (Exploring possibility for Beijing as well.)
- Global deal with co-working company for alumni access to Wharton hubs in New York and London.
- 40 “wine chats” scheduled approximately weekly in San Francisco.
  - 10-12 alums at a time.
  - Mix across age cohorts and programs.



## 5. Wharton Scale School



**Step 1:** Develop and launch “Scale School” for the Bay Area ecosystem.

- We won’t beat Stanford Engineering and Y Combinator in generating the fruit flies.
- Wharton is where you learn to build big, valuable, world-changing enterprises.
  - Linked-In, Google, Oracle, Tesla, Warby-Parker – all led by Wharton grads.
- Both a brand position and delivery of valuable capabilities.

**Step 2:** Extend the programs to Philadelphia and globally.