The Relationship of CEO Gender and Age to Performance of Venture-Backed Startups

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2017, 2018 Increasingly Urgent Red Flags

• Gender inequities persist in entrepreneurship.

• Females found 17% of all startups but receive only ~3% of all VC funding.

• Female founders and URM entrepreneurs face biases when fundraising.

• Funded startup team founders have primarily been males under 30.

• Pattern recognition selection bias perpetuates the status quo – doesn't increase pool of diverse founders - gender, age, URM status.

Motivation

- Bias is prejudice = pre-judgement
- Perform **research** starting - effect of gender and age on VC returns

Will our findings:

      - reveal that gender-based bias is not grounded in fact?

      - change VC investment behavior, patterns, attitudes, culture?

           - if money is left on the table

           - increase diversity in funded entrepreneurs

           - and inclusion in entrepreneurship

           - increase ROI on investments

           - increase economic impact, social welfare

           - indicate follow-on research

Kindred Spirit - Eric Ball of Impact Venture Capital

- **John Doerr**, 2008
  "The ideal entrepreneur is a white male nerd who has recently dropped out of Harvard or Stanford and has no social life."

- **Vinod Khosla**, 2012:
  "People over 45 basically die in terms of new ideas."

- Which entrepreneurs get funded? Kauffman Foundation (2013):
  Women own 40% of businesses, YET **92% of venture money → males and 70% of venture money goes to entrepreneurs younger than 30.**

- VCs rely on **Pattern recognition = stereotyping.**

  Daniel Applewhite (Forbes, 2018): "Pattern recognition has enabled VCs to mitigate risk but has also **limited their profit potential** and created an **inherent funding bias.**"

Methodology

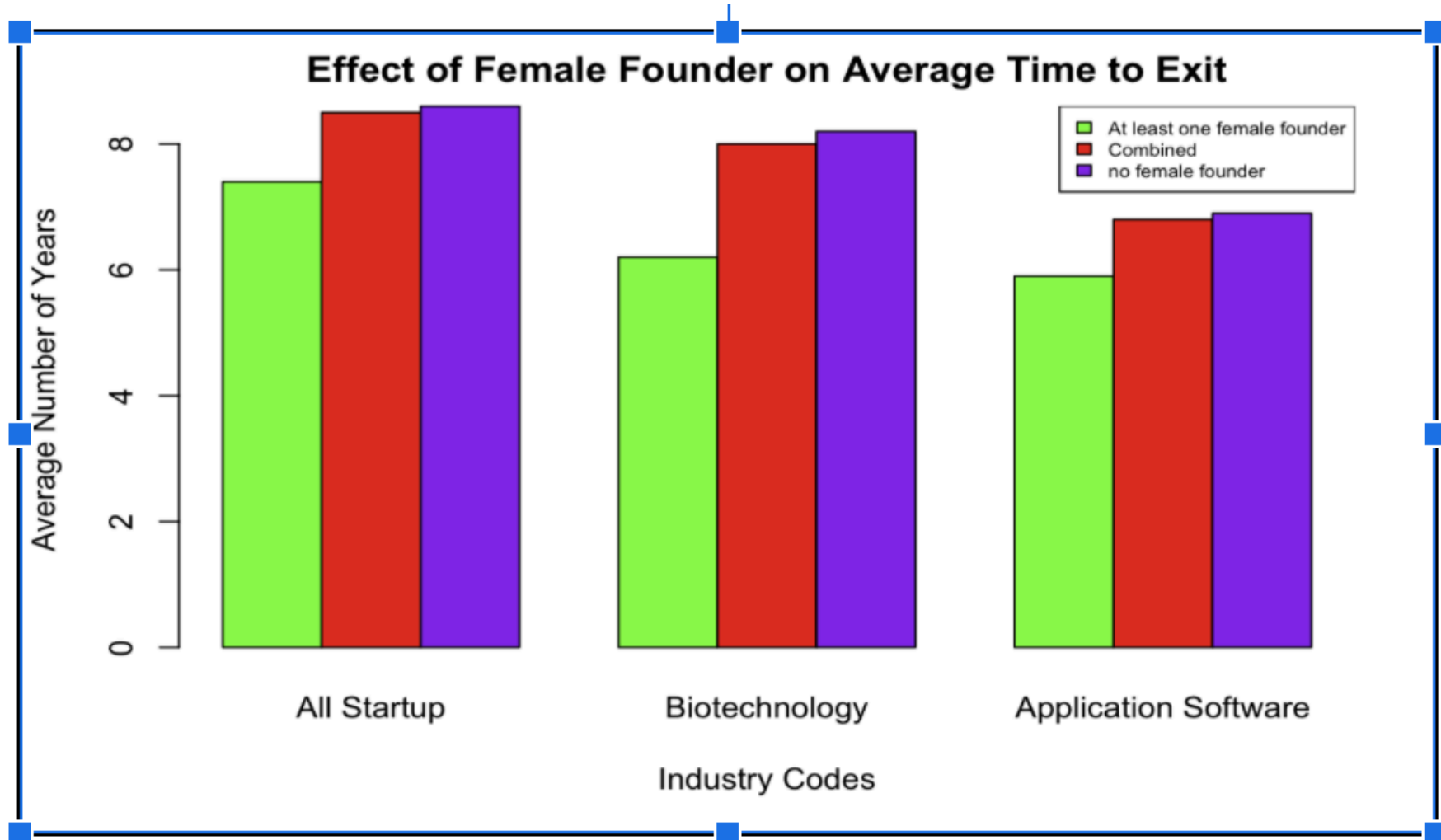171,300 startups HQ in the US → VC funding since 2000.
Pitchbook ~14,400 venture-backed startups (8%) in the U.S. exited since 2000.

- ~19,700 CEOs   1,438 (=7.3%) were female
- Gender and age of founders
    - 100's hours by dedicated students (UC Berkeley CS and Data Science)

- Deal sheets at exit (IPO, M&A) → value added ratio

- Determine value-added ratio of CEOs at exit
    - Regression analyses : effect of gender and age on ROI
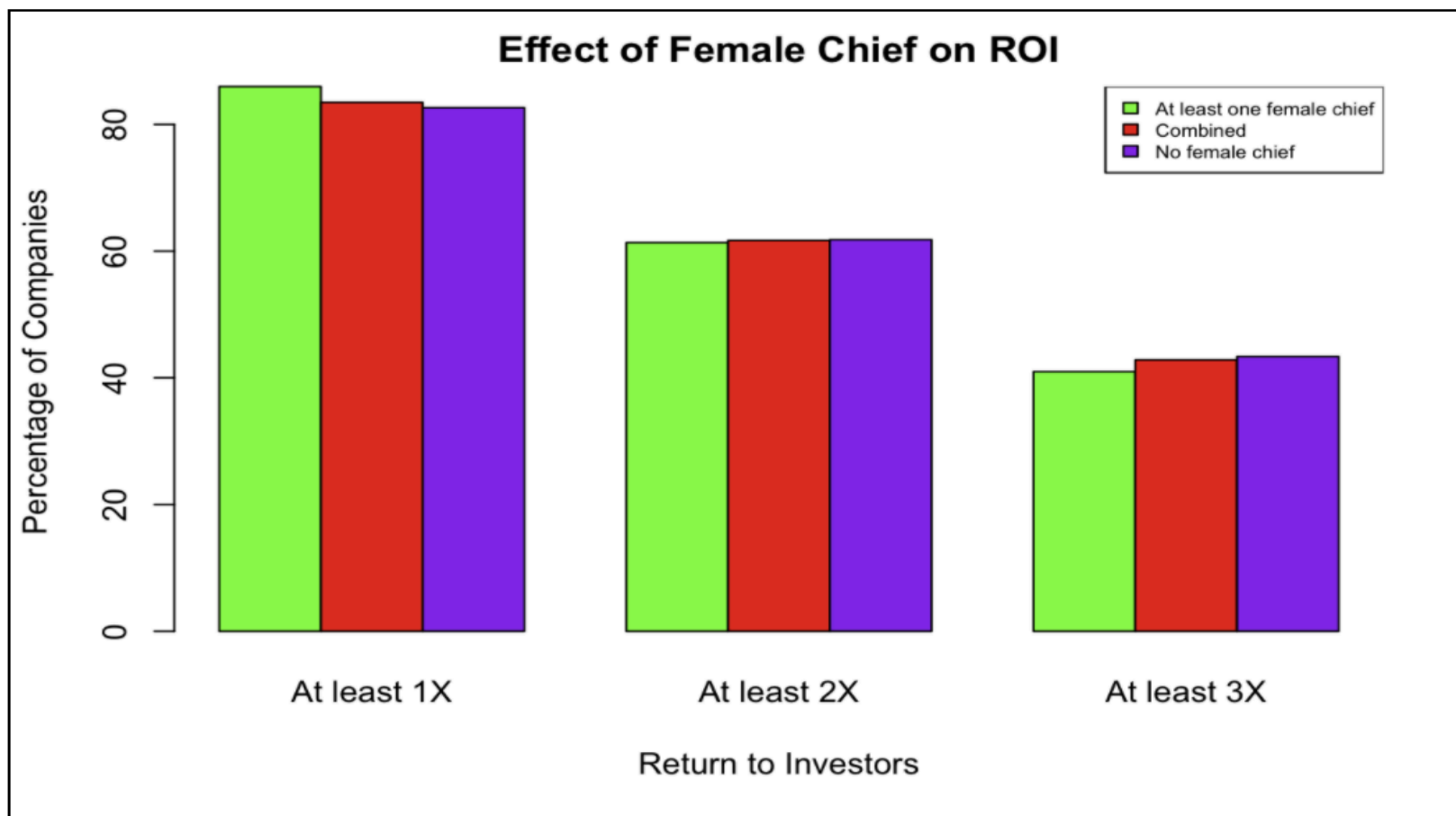   - Parse by technology field, geography

High-Level Conclusions

1) Value added by CEOs of VC-funded startups in the U.S. exited over the last 20 years **refutes the notion that males or younger entrepreneurs perform better than females or older entrepreneurs.**

2) Presence of **at least one female founder reduced the time to startup exit.**
　　　- **valuable** finding in view of startup burn rates, esp. in the biomedicine sector.

3) Increasing ages:
　　　slight **positive impact on ROI for female biotechnology** CEOs (Biotech = subset of Biomedicine).
　　　a slight negative impact on ROI for female Application Software CEOs.

4) Investors disregard good investments by not investing in more females.

Teams With **at Least One** Female Founder **SHORTENS** the Time to Exit

Effect of Female Founder on Average Time to Exit

Legend:
- At least one female founder (green)
- Combined (red)
- no female founder (purple)

Y-axis: Average Number of Years (0, 2, 4, 6, 8)

X-axis: Industry Codes — All Startup, Biotechnology, Application Software

Biases against providing funding to females are not justified by performance data.
Slight difference in ROI delivered by female vs. male CEOs at acquisition or IPO

Gender and Age vs. Value Added Ratio for **All CEOs Combined, not segmented into specific industries**

For <u>All Company CEOs</u>

• Slopes of the "least squares" regression lines through the data for both female and male CEOs are **nearly identical**.

• The difference in the value-added ratio for **all startup company CEOs combined** (not segmented into specific industries) is **negligible regardless of the gender or age of the CEO.**
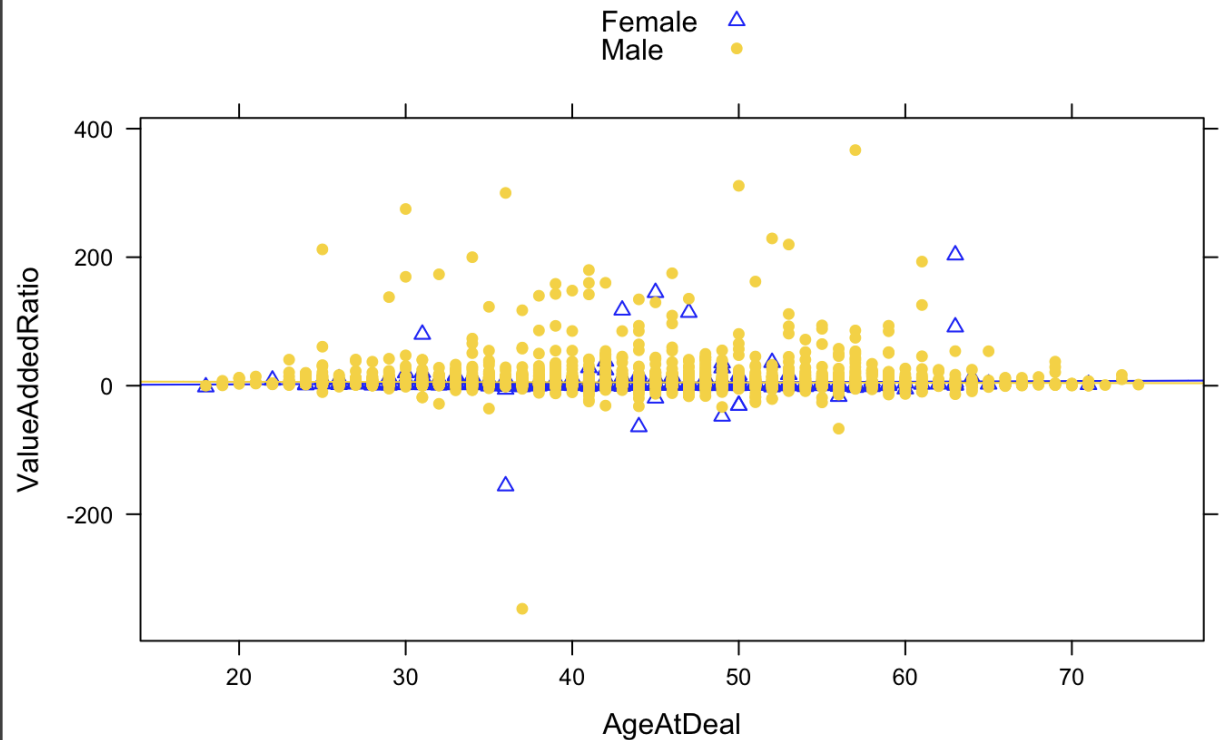
For BIOTECHNOLOGY CEOs

• The slope of the "least squares" regression lines through the data for **female CEOs is greater than** that of male CEOs.

• **Age has a positive impact** on the value-added ratio of female biotech CEOs.

• Where Biotech is a subset of biomedicine category
(and the number of female biotech CEOs is small compared to the number of male biotech CEOs).

Gender and Age vs. Value Added Ratio for BIOTECH CEOs

Female △
Male ●

ValueAddedRatio

AgeAtDeal

Gender and Age vs. Value Added Ratio for Application Software CEOs
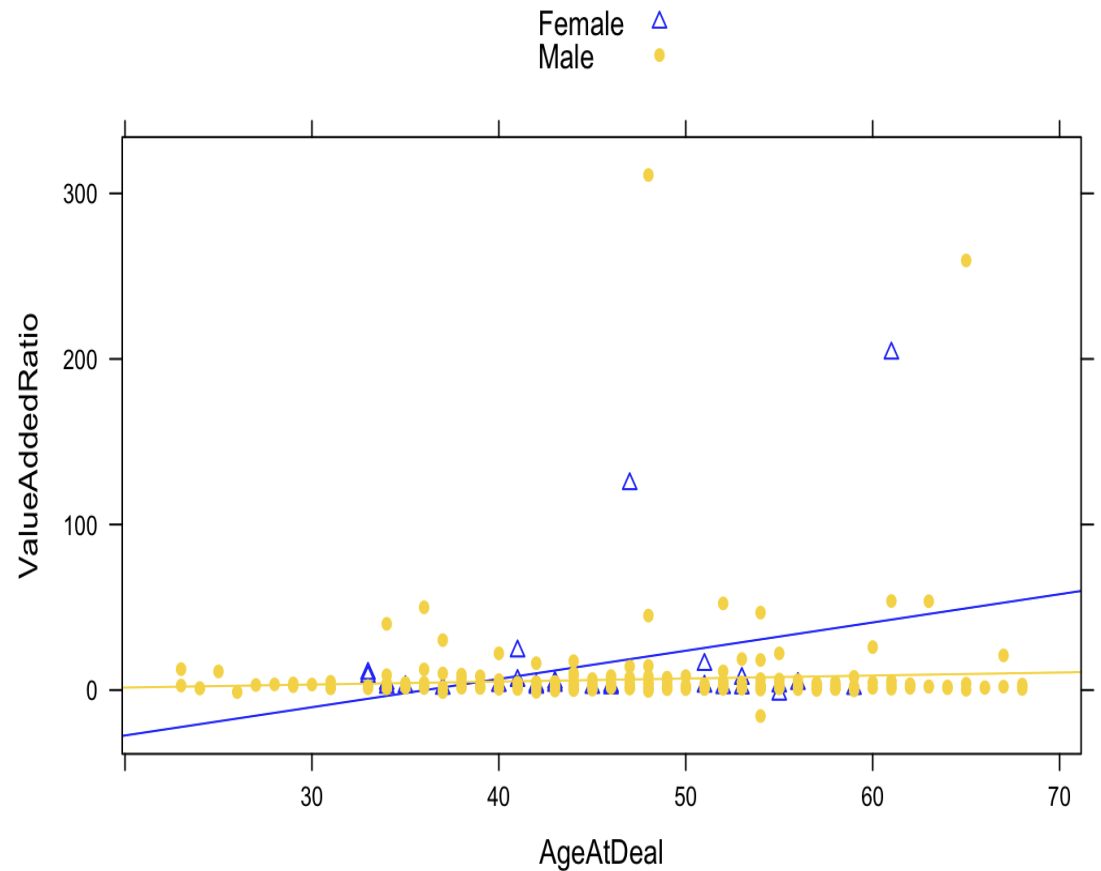
For **APPLICATION SOFTWARE CEOs**

• Value-added ratio for **male CEOs is slightly higher** than that of female CEOs.

• The value-added ratio of application software **female CEOs declines slightly with age.**
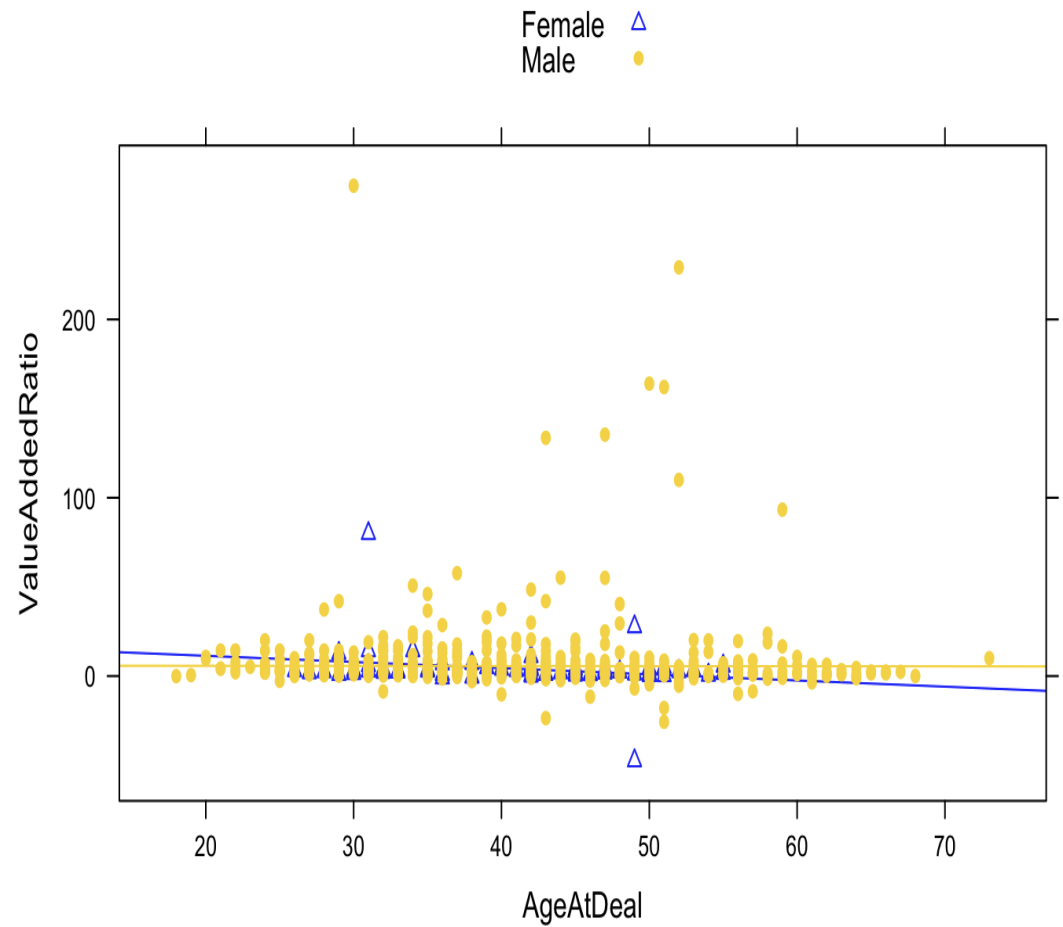
Selected Additional Conclusions

1) 171,300 Co's HQ in the U.S. received VC funding since 2000
- 14,400 = 8% exited
- of those, 12% at least one female founder
- 6.8% female CEO at exit

2) 2.7X more exits in the Software industry (= 42.3% of all exits)
   than in the Biomedicine industry (= 15.7% of all exits)

3) 3X more exits in the SF Bay Area (= 30.2% of all exits)
   than in the greater Boston area (= 9.6% of all exits)

4) 2% exits - Biotechnology (a subset of Biomedical sector)
       - Average age Biotechnology CEO <u>at exit</u> 48.

   8.9% of exited Biotechnology companies had a female CEO at first round of financing.

5) 10.9% of exits - Application Software (a subset of Software sector)
   The average age of an application software CEO <u>at exit </u>is 41.

   5.8% of exited Application Software co's had a female CEO at first round of financing.

Continuing Areas of Research

- Determine the URM status of founders
  effect of URM status on ROI

- Further analyze geographical statistics
  regional differences?

- Differences in investors? Number of female angels increasing
  - in investments? by technology area?
  - in participation? By numbers, by ROI

- Effect of increased diversity of funders and entrepreneurs
  - Stats "like mentoring like" pairings and results
  - outcomes (financial, non-financial)
- Funders who resemble demographics of the entrep. population→ more of
  everything – inventors, products, economic, social benefits

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