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July 21st, 2023

Dear Digital Economics and AI Tutorial Selection Committee,

I am delighted to apply for the Digital Economics and AI Tutorial, with significant encouragement from Bo Cowgill and Jorge Guzman. I am a 4th year Ph.D. Candidate in the Management Division (Strategy Subdivision) at Columbia Business School, having completed foundational courses in Management (stemming from psychology and sociology), in addition to the PhD economics sequence and Industrial Organization. My work focuses on understanding the individual level factors serving as antecedents to and consequences of firm strategy in technology entrepreneurship. In this vein, the first chapter of my dissertation (recently published in *PNAS*) uses novel computational methods to predict personality traits for 10.5K startup founders, linking this to startup success across phases of a venture's life cycle (from initial fundraising to acquisition and IPO). The second chapter explores how societal forces such as social movements can significantly alter the economic incentives and intrinsic motivations of venture capital firms, and in doing so, change their behavior. Finally, the third chapter studies the consequences of automation on industry-level heterogeneity. It shows how technology can alter the entry-decision incentives for would-be founders, causing a significant shift in who founds, and ultimately the types of and for whom products are built. Taken together, the three look at how behavioral and non-market forces can significantly influence strategic decision-making and startup performance in the technology entrepreneurship ecosystem. For this reason, I believe that the Digital Economics and AI tutorial is a fantastic fit for me and I'm excited to apply for the program.

My committee members are Stephan Meier, Dan Wang, Bo Cowgill and Sandra Matz. A brief summary of my dissertation proposal can be found below.

Thank you for organizing the tutorial and for your consideration. Please feel encouraged to contact me if you have any questions.

Best regards,
Brandon Freiberg

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Three Essays on Technology Entrepreneurship
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Abstract
Technology entrepreneurship is of great importance to economic growth, individual prosperity and the day-to-day life of billions of consumers. Yet, startup success is still incredibly difficult to predict, especially in the earliest stages of venture formation before metrics are available. Moreover, who benefits from the wealth and welfare generated is unequally distributed - stratified across socioeconomic, demographic and geographic boundaries. My dissertation explores these topics - specifically factors predicting early-stage startup success and inequality in the returns to technology entrepreneurship - through three lenses, each putting the individual (founder, venture capitalist, employee or consumer) front and center. The first essay uses novel computational methods to predict the personality traits of more than 10K startup founders, linking founder personality to startup outcomes across all stages of a venture's life cycle (from initial fundraising to acquisition and IPO). The second essay studies the effect of social movements (in particular, #MeToo) on venture investment as a means to ameliorate the staggering gender gap among technology founders. The third essay investigates the impact of automation (in our context, the launch of the technology Shopify) on who is able to found a company. It argues that Shopify reduces the fixed costs associated with launching a startup, thereby reducing the reliance of would-be founders on venture investors, benefiting those groups harmed the most by structural frictions and investor bias (women, black and latino founders). Together, the essays explore the influence of individual characteristics on the founding process, and how both social and technological processes influence the individual composition of the technology ecosystem.

Essay 1 - Founder Personality and Entrepreneurial Outcomes: A large-scale field study of technology startups
Technology startups play an essential role in the economy - with seven of the ten largest companies rooted in technology, and venture capital investments totaling approximately $300B annually. Yet, important startup outcomes (e.g., whether a startup raises venture capital or gets acquired) remain difficult to forecast – particularly during the early stages of venture formation. Here, we examine the impact of an essential, yet underexplored, factor that can be observed from the moment of startup creation: Founder personality. We leverage novel approaches to predicting psychological traits from digital footprints to explore how founder personality is associated with critical startup milestones. Observing 10,541 founder-startup dyads, we provide large-scale, ecologically valid evidence that founder personality is associated with outcomes across all phases of a venture's life (i.e., from raising the earliest funding round to exiting via acquisition or IPO). We find that openness and agreeableness are positively related the likelihood of raising an initial round of funding (but unrelated to all subsequent conditional outcomes). Neuroticism is negatively related to all outcomes, highlighting the importance of founders' resilience. Finally, conscientiousness is positively related to early-stage investment, but negatively related to exit conditional on funding. While prior work has painted conscientiousness as a major benefactor of performance, our findings highlight a potential boundary condition: The fast-moving world of technology startups affords founders with lower or moderate levels of conscientiousness a competitive advantage when it comes to monetizing their business via acquisition or IPO.

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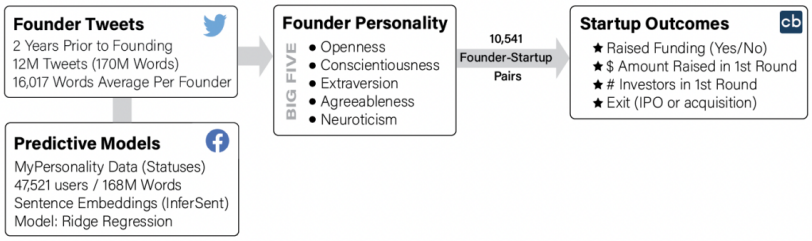


Fig. 1. Data processing flowchart. Founders' Big Five personality traits were predicted from their Tweets. The predictive models (ridge regressions based on sentence embeddings) were trained on MyPersonality data which combines self-reported Big Five traits with status updates. Startup outcomes were extracted from Crunchbase.

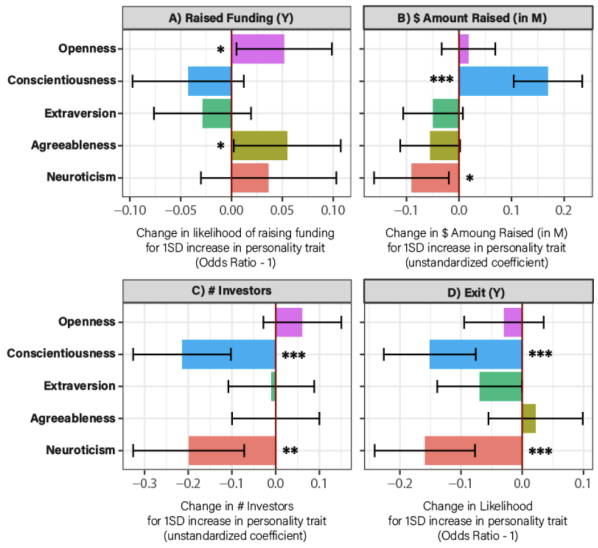


Fig. 2. Relationships between founders' Big Five personality traits (z-standardized) and startup outcomes. **A)** %-Change in the likelihood of raising funding. **B)** Change in the dollar amount raised in the first round (in Million). **C)** Change in the number of investors in the first round. **D)** %-Change in the likelihood of exiting (via IPO or acquisition). d* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Essay 2 - Social Movements and Technology Entrepreneurship: Evidence from #MeToo

Technology entrepreneurship is of great importance to both economic growth and individual prosperity. Yet, there are significant inequalities in who benefits from the wealth generated. The most pronounced example of this may be the well-established gender gap among startup founders. Here, we examine whether social movements may reduce this inequality by catalyzing increased investment into women founded ventures. To test our hypothesis, we exploit city-level variation in exposure to #MeToo, which is attributed in part to time and location specific scandals, and measured using 1.5M geotagged tweets and 139 physical protests. We find that venture capital funds located in cities highly exposed to #MeToo increased the number of investments they made into women-majority founded startups by 27%. This effect is primarily driven by women founded venture funds. The effect magnitude peaks approximately 11 months after the movement's onset, and drops to about 6% above baseline after at the end of our 3 year sample. Finally, this increased investment into majority-women founded startups has significant downstream

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consequences on the gender of early-stage employees hired and the consumers for whom products are built at venture-funded startups.

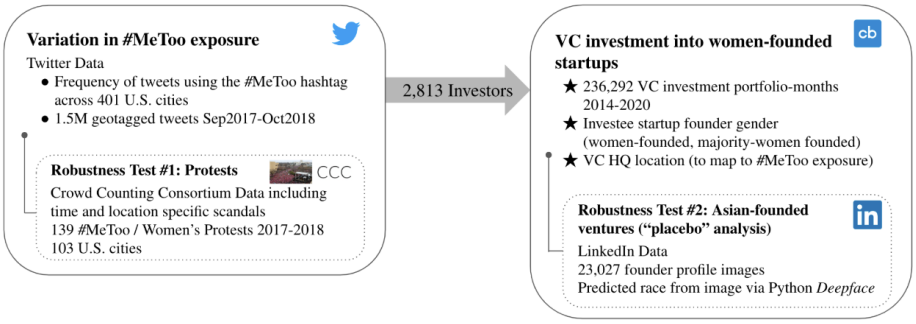
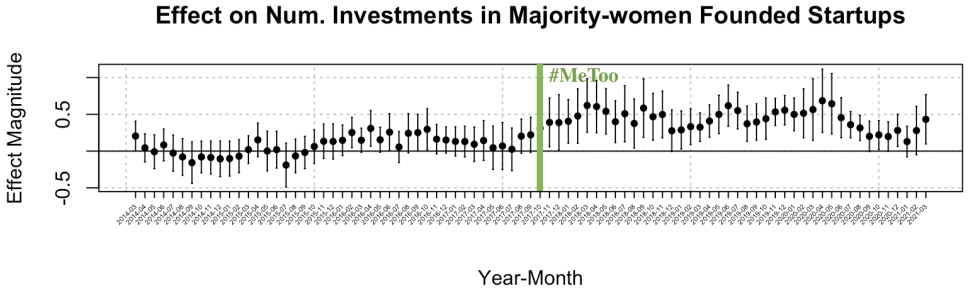


Fig 1. Main analysis data processing flowchart



Essay 3 - Automation and the Democratization of Technology Entrepreneurship: Evidence from Shopify

The removal of barriers to entry is typically associated with a reduction in entrant quality. This has been shown both in labor markets as well as industry dynamics. Here, however, we argue that when the barriers to entry are connected to structural frictions and gatekeeper bias, lowering entry costs can lead to both increased quality and entrant diversity. In our context of technology entrepreneurship, where founders are often required to solicit support from venture investors to finance the initial versions of their products, we show that the introduction of Shopify, a technology that reduces the cost of launching a direct-to-consumer startup by removing the need for technical employees, leads to an increase in the number of high quality women, black and latino founders in affected industries.

