

Responsible Investing in Tech and Venture Capital

Advancing Public Purpose in Frontier Technology Companies

Susan Winterberg

FACULTY DIRECTOR

Laura Manley

Ash Carter

Karen Ejiofor

Amritha Jayanti

Joseph Fridman

Sam Lambert

Marta Zwierz



HARVARD Kennedy School

BELFER CENTER

for Science and International Affairs

PAPER

AUGUST 2020



Technology and Public Purpose Project

Belfer Center for Science and International Affairs
Harvard Kennedy School
79 JFK Street
Cambridge, MA 02138

www.belfercenter.org/TAPP

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About the Project

The arc of innovative progress has reached an inflection point.

Technological change has brought immeasurable benefits to billions through improved health, productivity, and convenience. Yet as recent events have shown, unless we actively manage their risks to society, new technologies may also bring unforeseen destructive consequences. Making technological change positive for all is the critical challenge of our time. We ourselves - not only the logic of discovery and market forces - must manage it. To create a future where technology serves humanity as a whole, we need a new approach.

To this end, Harvard Kennedy School's Belfer Center for Science and International Affairs has launched a new endeavor, the Technology and Public Purpose (TAPP) Project. Led by Belfer Center Director, MIT Innovation Fellow, and former Secretary of Defense Ash Carter, the TAPP Project works to ensure that emerging technologies are developed and managed in ways that serve the overall public good.

Much as the reforms of the Progressive movement softened the edges of the farm-to-factory migration a century ago, we aim to create a set of conditions that leaven today's technological change across three domains: digital, biotech, and the future of work. TAPP leverages a network of experts from Harvard University, MIT, and the Greater Boston Area, along with leaders in technology, government, and business to work on the following priorities:

- **Training & Mentorship**—Training today's practitioners and tomorrow's leaders in the responsible development and management of new technologies.
- **Convening Stakeholders**—Convening leaders in tech, policy, academia, and civil society to develop solutions to the societal dilemmas of emerging technologies.
- **Publishing Leading Edge Research**—Conducting world-class research on high-risk technologies and frameworks for effective development and governance.

Contributors

Lead Author

Susan Winterberg, Inaugural Fellow, Technology & Public Purpose (TAPP) Project

Technology & Public Purpose Project

Laura Manley, Director

Karen Obiageli Ejiofor, Project Coordinator

Amritha Jayanti, Research Assistant

Joseph Fridman, Student Research Assistant

Samuel Lambert, Student Research Assistant

Marta Zwierz, Student Research Assistant

Faculty Director

Ash Carter, Director, Harvard Kennedy School Belfer Center for Science & International Affairs

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Table of Contents

Executive Summary	1
Key Challenges	2
Potential Solutions	3
Contents	4
 1. Venture Capital and Frontier Technologies	5
Why Venture Capital Needs Responsible Investing	5
Frontier Technologies: Venture Capital in the 2020s	6
 2. How ESG contributes to Venture Success.....	8
How does ESG contribute to financial returns?	8
What drives financial returns in venture capital?	9
Success vs. Failure Factors	11
 3. Responsible Investing in Venture Capital Firms	20
Fundraising	21
Sourcing and Due Diligence	22
Active Management	24
Exits	25
 4. Road Map: An Action Agenda to Advance Public Purpose in Venture Capital	26
Action 1: Technology & Risk	27
Action 2: Data & Transparency	30
Action 3: Diversity & Culture	33
Next Steps	35
 Annexes	36
Annex 1—Key Concepts: Responsible Investing & Venture Capital	36
Annex 2: Future-Proofing Sample Exercises	41
Annex 3: Research, Data, and Reporting Sample Tools	53



Executive Summary

Venture capital firms play a critical role in shaping the future of technology, industry and society. Historically, venture capital firms have been the first investors in many of the world's largest and most influential companies including Google, Facebook, Twitter, Uber and many other global tech companies. The business model, culture, and values of global companies are often shaped in the early years of a company's development, and venture capital firms as the first investors and board members play an important role in this process.

In the last few years, the world's largest tech companies have run into major challenges in managing societal issues—the result of which has been governments, media, and activists taking a much deeper look how foundational values and cultures were shaped. For example, Google, Facebook, Twitter and other social media platforms have faced increasing scrutiny into their business models of selling user data, squashing out competitors, and their roles in upholding democracy and human rights. While other major digital platform companies including Uber and Lyft have also faced challenges with ensuring living wages, social safety nets and safety standards are maintained.

The conversation around who is accountable for ensuring technology companies manage public purpose issues often focuses on the role of the company leadership team or the government. Yet another group—investors—also play a pivotal role. During the last decade the practice of responsible investing has become increasingly mainstream. In 2018, more than 70% of institutional investors integrated ESG (environment, social, governance) considerations into the selection and management of their investments. ESG practices now span major asset classes from public companies, private equity, real estate, bonds, and commodities. Yet **venture capital has lagged behind other asset classes, with no systematic approach to screening, managing or reporting ESG performance or other societal considerations specific to frontier technologies.** This report reviews a range of dilemmas that the venture capital industry faces in managing ESG considerations and proposes potential solutions that the industry could adopt.




Key Challenges

- **Venture capital firms are investing in frontier technologies with potential to be disruptive to global security, public health, democracy, and many other areas of society—making the need for responsible investment practices urgent.** During the 2010s venture capital investment focused largely on enterprise solutions and consumer digital platforms which produced many iconic companies including Uber, Lyft, Airbnb. Digital platform companies upended labor markets and brought new challenges to jobs and financial security. These challenges will continue into the next decade as automation systems displace workers across the world. Venture capitalists are also actively investing in a wide range of disruptive technologies including artificial intelligence, quantum computing, autonomous vehicles, drones, and frontier life sciences. These technologies will bring unprecedented challenges to privacy, inclusion, and human rights.
- **There could be improved financial performance in venture capital firms by better managing ESG and other societal risk issues.** Research has increasingly shown that managing ESG and other public purpose issues link to better financial outcomes in companies through lowering risks and improving brands and customer relationships. Although venture capital is considered among the highest risk forms of investment, the industry doesn't currently have a systematic approach to ESG or societal risk management. Around 70% of ventures fail within the first two years. Some late stage ventures such as Theranos have filed for bankruptcy due to underlying governance and technological integrity issues. Further, recent IPOs including WeWork, Uber, and Lyft have seen significant losses in valuation due to underlying challenges with managing technological issues, stakeholders, and governance. There could be significant potential for increased financial returns to investors by developing new mechanisms to uncover and mitigate risks earlier in the investment process.
- The venture capital industry has limited tools and data available to evaluate societal impacts, especially for frontier technologies. There are limited tools for venture capital firms to use to systematically

evaluate and manage ESG and public purpose issues. More specifically, there are no standard tools for investors to evaluate frontier technology issues like privacy, cybersecurity and ethical AI. There is also no data currently available for investors to evaluate risks and ESG performance of ventures, in the same way that the industry has created databases for market and financial data. There is also limited technical support available to ventures. Corporate functions responsible for managing societal issues including Risk Management, Corporate Social Responsibility (CSR), and Corporate Affairs (legal, government affairs, public relations) typically are not fully operational in early stage ventures. Furthermore, there is no systematic support available for early stage tech companies or boards looking to develop the skills needed to effectively integrate societal considerations into their products and business models.

Potential Solutions

The path forward for advancing public purpose in venture capital could involve multiple strategies including:

 Technology and Risk	 Data and Transparency	 Diversity and Culture
Future-Proofing Tools & Trainings Tools and trainings for VCs and founders to assess values, stakeholders, risks, and unintended consequences.	Ratings Third party scoring of ESG performance and other relevant data to public purpose	Diverse Fund Managers & Founders Increase diversity in VC firm and portfolio company leadership
Technology Assessments Independent evaluations of technological readiness, product-market fit, and societal impacts.	Interoperable Data Comparable data on ventures performance on ESG and public purpose issues	Ethical Culture Trainings for an ethical culture in VC firms and portfolio companies
Governance Support Tools for venture boards and whistleblowing mechanism.		

Contents

This discussion paper is not intended to be a comprehensive study of the venture capital, ESG, or frontier technology industries. It highlights several challenges and some potential solutions for advancing managing societal impacts of venture capital firms and portfolio companies.

This paper includes the following sections:

- **Chapter 1 Venture Capital and Frontier Technologies:** A review of the challenges frontier technologies pose to society
- **Chapter 2 How ESG Contributes to Venture Success:** A high-level literature review and framework for how ESG factors contribute to financial outcomes of venture capital-backed companies
- **Chapter 3 Responsible Investing in Venture Capital Firms:** The levers venture capital firms have to integrate ESG considerations at each stage from fundraising to exit
- **Chapter 4 Roadmap:** An action agenda to move the venture capital industry forward through improved management of diversity, culture, technology assessment, risk management, and the creation and reporting of public purpose data

Annexes:

- **Annex 1: Key Concepts—Responsible Investing & Venture Capital** - A review of definitions and concepts of responsible investing and venture capital
- **Annex 2: Future-Proofing Sample Exercises** - A high-level concept for a tool that could be built to improve identifying, managing, and evaluating technological, business, legal, and societal issues in technology ventures
- **Annex 3: Research, Data & Reporting Sample Tools** - A concept for a technology assessment program, ESG ratings, and database that could aid venture capital investors in decision-making and management.

1. **Venture Capital and Frontier Technologies**

Why Venture Capital Needs Responsible Investing

Venture capital firms play a critical role in shaping the future of technology, industry and society. Many of today's leading companies including Amazon, Apple, Facebook, and Google got their starts with venture capital funding. These companies alone account for over \$3 Trillion in market capitalization. More importantly, their products and operations have influence in an unprecedented number and range of industries: advertising, communication, media, retail, transportation and an increasingly many more. Dozens of digital platform companies including Uber, Lyft, Airbnb, Instacart, and DoorDash also had their beginnings with venture capital funding. These companies have fundamentally transformed industries from transportation, housing, retail, and restaurants.

At the same time many of these companies have run into major challenges related to their business models and management of key stakeholders including workers, communities, and government relations around the world. Google, Facebook, Twitter and other social media platforms have faced increasing scrutiny to their business models of selling user data and their roles in managing democracy and human rights. Digital platform companies have faced challenges with ensuring living wages, social safety nets and safety standards are maintained. These cases have had investors, governments and the general public taking a much closer look at how the foundational values and practices related to management of societal impacts were considered in the earliest stages of companies.

Frontier Technologies: Venture Capital in the 2020s

During the 2010s venture-capital backed companies focused mostly on enterprise solutions and consumer digital platforms utilizing smartphone technologies to match sellers and customers of services. This led to many challenges in labor and workforce, and challenges to ensure safety and integrity, and privacy of consumers using these platforms.¹ These challenges will continue into the coming decade as AI and advanced robotics continue to upend labor markets and displace workers around the world. Yet this new generation of start-ups also pose novel challenges to societies. (See **Figure 1** for a sample list of frontier technologies with disruptive potential to society)

Figure 1. Sample Public Purpose Challenges and Associated Frontier Technologies



Venture capital firms are supporting many frontier technologies² with broad-ranging potential for disruption,³ which could pose critical challenges to society, among which include:^{4, 5}

1 Madrigal, Alexis. 2019. "The Servant Economy." *The Atlantic* ([Available Online](#))

2 *Frontier technologies* are defined as: "technologies currently being developed and holding realistic potential to not only become reality but to become socially and economically relevant in the foreseeable future." See: Stahl, Bernd Carsten, Job Timmermans, Catherine Flick. 2017. "Ethics of Emerging Information and Communication Technologies: On the Implementation of Responsible Research and Innovation," *Science and Public Policy* 44: 369–381.

3 The Gartner Hype Cycle tracks progress of frontier technologies annually. See: "Gartner Hype Cycle 2019." ([Available Online](#))

4 For analysis of how frontier technologies map to SASB standards see: Harvard Belfer Center. 2019. "Reimagining Investing in Frontier Technology." ([Available Online](#))

5 The CFIUS Critical Technologies list also maps technologies by their abuse potential by foreign state actors. For a review see: Carnegie, Les P. et al. 2020 "How Final CFIUS Regulations will Impact Technology Companies and Investors." NYU School of Law. ([Available Online](#))

- *Artificial Intelligence*: Thousands of start-ups are building AI-enabled decision making in employment, education, health care, criminal justice, military, political campaigns and more.⁶ These systems will increasingly decide who has access to opportunities. Pervasive biometric systems like facial recognition will also create unprecedented levels of surveillance that could limit fundamental rights like freedom of movement and assembly.
- *Quantum Computing*: New supercomputing systems could make existing cybersecurity systems obsolete posing threats to individuals, companies, and governments around the world.⁷
- *Autonomous Vehicles & Drones*: New autonomous systems from cars and trucks to ships, drones, and weapons systems will be new targets for cyberattacks and pose risks to public safety
- *Brain-Computer Interfaces*: Wearable headsets and implantable devices that provide ‘hands-free’ control of keyboards and joysticks will pose unprecedented human rights challenges as technology crosses the ‘last frontier of privacy’ to look inside the brain⁸
- *Gene Editing, Cognitive Enhancement and Longevity*: Elective procedures and treatments will offer consumers the chance to enhance genetic traits, brain performance and extend lifespans⁹ - many of which will enter the market without regulatory approval or oversight.

This provides a new level of urgency for early-stage investors to evaluate and manage impacts of new technologies on society.

6 CBInsights. 2020. “AI 100: The Artificial Intelligence Start-ups Redefining Industries.” ([Available Online](#))

7 Gossett, Stephen. 2020. “20 Quantum Computing Companies to Know.” ([Available Online](#))

8 “Brain-Computer Interfaces.” *MIT Technology Review* ([Available Online](#))

9 Nanalyze. 2019. “The Top 10 Companies Working to Increase Longevity.” ([Available Online](#))

2. How ESG contributes to Venture Success

How does ESG contribute to financial returns?

Most of what is known about which factors drive financial performance in companies comes from large-scale quantitative studies on publicly-traded companies. (See **Figure 2**) Among the factors that drive investment returns are allocation and distribution of capital (dividends, buybacks), R&D, sales growth, debt levels, and the presence of short-term vs. long-term investors.

Among these factors with proven links to financial returns are two issues that directly link to societal issues: ‘Board Diversity’ and ‘ESG controversies.’

Studies that look deeper into the ESG dimension have revealed that companies that perform well on ESG metrics that are material to their industry have higher financial returns relative to their peers over those that perform poorly.¹⁰ The reasons for this are likely due to the wide range of value-drivers to which ESG links including:

Figure 2. What Drives Long-Term Financial Performance in Public Companies?

A study conducted by the think tank FCLT Global looked at 10-year Return on Invested Capital (ROIC) and found the factors that predict better long-term financial success were:

- Greater fixed investment (CapEX-Depreciation/Assets)
- Higher R&D investment (research quotient, RQ)
- Greater Board Diversity (% women)
- Sales Growth
- Presence of long-term investors

Conversely, factors which predict poor long-term financial performance include:

- Over-distribution of Capital
- ESG controversies
- High debt levels (Leverage Ratio)
- Issuing quarterly earnings guidance

Source: FCLT Global. 2019. “Predicting Long-term Success for Corporations and Investors Worldwide.” ([Available Online](#))

¹⁰ Khan, Mozaffar and Serafeim, George and Yoon, Aaron. 2016. “Corporate Sustainability: First Evidence on Materiality.” *The Accounting Review* Available at SSRN: <https://ssrn.com/abstract=2575912>

- **Revenues** On the revenue side, ESG can improve performance by increasing brand value and consumer trust. A recent survey showed that 75 percent of Millennials say they factor in a company's values when making purchasing decisions¹¹ and a similar number factor it into deciding where they will work.¹²
- **Expenses** On the expense side, good ESG management can reduce costs due to prevention of employee turnover, accidents, quality control and product recalls. It can also reduce potential violations of laws and associated costs of lawsuits and fines. Good ESG management including government and community relations and responsible sourcing can reduce disruptions due to geopolitical issues, climate change, supply chain disruptions, and issues related labor actions and consumer boycotts.

What drives financial returns in venture capital?

In venture capital financial returns are measured at the portfolio level as an Internal Rate of Return (IRR). The IRR is a measure of the effective annualized rate of return that is earned on a portfolio. This can be notoriously difficult to estimate in advance as venture capital can have long holding periods of 7-10 years or even more and doesn't have annual payouts along the way in the form of interest or dividends. Another unique feature of venture capital is that at around 60% of fund returns are generated from just 5-10% of investments.¹³

The *venture capital funnel* is the process by which a portfolio reduces over time as companies fail or exit. One study by the research firm CBInsights¹⁴ tracked 1,100 tech ventures that raised seed funding during 2008-2010.

11 Nielson. 2018. "Was 2018 the Year of the Influential Sustainable Consumer?" ([Available Online](#))

12 Sustainable Brands. 2017. "3 of 4 Millennials would take a Pay Cut to Work for a Socially Responsible Company." ([Available Online](#))

13 Other common measures include Distribution to Paid-In multiple (DPI) and Total Value to Paid-In Capital multiple (TVPI). See: Brightspark. 2018. "Making Sense of VC Fund Returns." *Medium* ([Available Online](#))

14 CBInsights. 2018. "Venture Capital Funnel Shows Odds of Becoming A Unicorn Are About 1%." ([Available Online](#))

Only 48% of these seed stage companies went on to raise Series A funding. The cohort continued to dwindle at each stage. Around 15% of the original cohort companies raised a Series C. Of the original cohort, only 1% achieved “unicorn” status with valuations over \$1Billion. In this group were 12 companies including Uber, Slack, Stripe and Airbnb. Another 1% (13 companies) exited over \$500 Million. In total, only 30% of the original companies had an exit through M&A or IPO.

Figure 3. Success and Failure Factors of Ventures



Success vs. Failure Factors

There have been two approaches to identifying key drivers of financial outcomes in ventures:

- *Quantitative studies* analyze data in industry databases and look for statistical relationships for financial outcomes. For example, CBInsights Mosaic uses machine learning to predict financial returns of ventures.¹⁵ The three factors of Mosaic are: 1. Money (financing, burn rate, investor quality) 2. Market (industry-level strength including total investment, hiring levels, and exit quality) and 3. Momentum (individual firm level strength relative to peers including news mentions, partnerships, and product downloads/sales).
- *Qualitative studies* analyze cohorts of companies and track their performance over many years. Analysts review public information on companies and label factors that founders, investors and media reported as contributing to outcomes.

For the purposes of understanding how financial outcomes of ventures relate to ESG practices, the factors that have been shown to contribute to success or failure of ventures, can be sorted (albeit imperfectly) into commercial reasons and those reasons that have an ESG component (see **Figure 3** for a proposed framework of ESG and commercial factors).

They can also be sorted as success factors or failure factors. *Success factors* are factors that are common among companies which had profitable exits. *Failure factors*, conversely, are a common set of factors that led a company to either go out of business or not meet a target threshold for returns.

Interestingly, most of the success factors have been encoded into data sets that are collected and tracked in industry databases such as Pitchbook, CBInsights Mosaic, and Crunchbase. However, most of the failure factors are not tracked in industry databases—suggesting there is a lack of ‘risk ratings’ for investors in ventures.

15 CBInsights. 2015. “Moneyball for Startups.” ([Available Online](#))

Commercial Factors

Commercial factors relate to issues such as market conditions, financial management, and team dynamics. Although these factors share some common touchpoints with ESG, their primary drivers are not informed by ESG practices.

Success Factors. The first criteria investors look for in high-growth ventures is whether the venture is in an in-demand industry or market with good exit opportunities. Drilling down to the individual venture level, investors then look at the strength of sales and financial indicators relative to similar companies in its space including:¹⁶

- **Sales Growth:** The rate at which the company is acquiring new customers and sales indicates desirability of product in the marketplace and ability to execute
- **Number of Employees:** The number of employees the firm is either hiring or laying off can indicate its overall prospects for future growth.
- **Cash Burn:** The rate at which the venture is spending down its remaining cash indicates current financial health.
- **Syndicate of Investors:** The overall reputation of the investors in the syndicate signals likely quality of the opportunity (assuming that the venture capital firms with highest returns historically have access to best investment opportunities currently).

Failure Factors. Ventures which ultimately failed to raise follow-on funding, went out of business, exited below capital invested, or otherwise failed to meet target returns involved some combination of contributing factors including:¹⁷

- **Product-Market Fit:** The most common reasons relate to product-market fit—or the ability to create a product that solves a

¹⁶ CBInsights. “Understanding Tech Startups Health.” ([Available Online](#))

¹⁷ CBInsights. 2019. “The Top 20 Reasons Why Startups Fail.” ([Available Online](#))

customer need in a scalable way—with one study finding that 42% of venture failures included this reason.¹⁸

- **Execution Challenges:** Several challenges can also surface during execution including cost and pricing, marketing, pursuing a failing strategy for too long, or failure to pivot to a better strategy. Some companies get out-competed and lose market share. These compounding challenges can lead to failure to raise additional rounds of financing leading to the company going out of business.¹⁹
- **Team Challenges:** Another common set of reasons for failures can be attributed to issues of the company leadership as having the wrong mix of expertise, personality dynamics, or founders eventually losing interest and moving on.²⁰

ESG Factors

ESG factors are those which directly link to issues managed within a Corporate Affairs (legal, public relations, regulatory affairs), Corporate Social Responsibility or Risk Management function of a company.

Success Factors. Two dimensions of what venture capital investors evaluate as success factors have direct links to ESG performance.

- **Reputation:** The reputation of ventures is tracked through social media and news media using sentiment analysis. This analysis looks for the total volume of discussion relative to peer companies as well as the overall sentiment of what is said.²¹ Companies that are embroiled in ESG controversies often receive disproportionate negative media attention.

18 CBInsights. 2019. "The Top 20 Reasons Why Startups Fail." (Available Online)

19 CBInsights. 2019. "The Top 20 Reasons Why Startups Fail." (Available Online)

20 CBInsights. 2019. "The Top 20 Reasons Why Startups Fail." (Available Online)

21 Both CBInsights MOSIAC and Pitchbook track news coverage in their databases.

- **Partnerships:** Another variable that investors track is the number and quality of partnerships.²² This indicator signals to investors that credible third parties such as major customers, suppliers, and distributors see the venture as providing the best solution in the space. Many large multinationals have ethical sourcing policies and supplier codes of conduct, which often (not always) involve some level of vetting of ESG performance such as technical performance and integrity of product, environmental management, labor rights, and review of compliance, lawsuits, and regulatory infractions.

Failure Factors. There are a wide variety of factors behind venture failures that link to ESG issues ranging from product integrity issues to failures of stakeholder management to governance issues. These factors have historically been cited in reasons for failure less frequently than commercial factors, with one study finding these factors contributed to less than 10% of venture failures.²³ Yet when they did occur, they often came in later stage ventures after considerable investment had been made. Sometimes ESG factors surfaced in companies that were classified as financially successful - but reduced their market opportunities or valuations. As more ventures pursue the development of artificial intelligence services and ‘moonshot’ technologies in areas like space, life sciences, and advanced computing, ESG controversies are likely to feature more prominently in failure factors in future cohorts.

- **Technology Readiness & Product Integrity:** A key challenge ventures building new technologies face is ensuring that their products work as claimed and that they explain the capabilities and limitations of their products clearly to their customers.
 - *Hype & Claims:* Ventures building new technologies (rather than building customer solutions utilizing existing technologies) face several unique challenges. Sometimes technologies leave university labs prematurely without a clear pathway towards technical viability. Ventures are often under intense time pressure to develop working prototypes

²² CBInsights MOSIAC track partnerships in their database.

²³ CBInsights. 2019. “The Top 20 Reasons Why Startups Fail.” (Available Online)

that can be tested in real-world settings or to achieve sales targets—which may take priority over achieving high levels of technical performance and safety. In extreme situations, an entire business can fail due to readiness or product integrity. This is what happened at Theranos, when it became apparent that its finger-prick blood testing technology did not have a working prototype after securing partnerships with major distributors and sales to real patients –and after \$700 Million was invested at a valuation of \$10 Billion.²⁴

- *Transparency & Explainability:* A major challenge of artificial intelligence companies relates to transparency and explainability of the decisions made by their products. As an example, in 2019 the Electronic Privacy Information Center (EPIC) filed a complaint at the U.S. Federal Trade Commission (FTC) to investigate HireVue, an artificial intelligence software used by many Fortune 100 Companies as a ‘candidate scoring’ system to rate job applicants on the grounds that it engages in ‘unfair and deceptive practices’ due to a lack of scientific evidence on linking facial expressions to job performance, among other concerns.²⁵ It is likely that explainability and AI bias cases will become increasingly common among ventures building AI solutions in the future.

- **Stakeholder Management:** Another set of factors relate to the management of stakeholders including customers, suppliers, employees and contract-workers, communities, civil society, and governments. Among the factors that might contribute are:

- *Legal and Regulatory Challenges:* Ventures building new technologies and business models sometimes run into challenges with government regulators. This can arise due to not having a team in place at an early stage to manage

24 Marinova, Polina. 2018. “How to Lose \$700 Million, Theranos-Style.” *Fortune* ([Available Online](#))

25 Chen, Angela. 2019. “The AI Hiring Industry is Under Scrutiny—but will be Hard to Fix.” *MIT Technology Review* ([Available Online](#))

regulatory affairs—such as what happened to direct-to-consumer genetics testing company 23andme, which had to discontinue sales of its genetic health risks testing for four years after the FDA determined in 2013 it was a medical device.²⁶ Other times it can result in costly fines in situations where ventures face long delays in the testing and deployment of their products. In 2018 the start-up Swarm Technologies launched microsatellites into space without receiving regulatory approvals, an action for which it was fined \$900,000 by the U.S. Federal Communications Commission,²⁷ at a point when it had raised only \$2.6 Million in seed funding.²⁸

- *Sustainable Business Model Challenges:* Some ventures develop business models that capitalize on differences in knowledge or negotiating power such as low-wage day laborers or customers who are not tech-savvy on data privacy practices. Most famously, many digital platform business models assumed that they would be able to operate indefinitely in a regulatory environment where they could use low-wage contract workers not entitled to basic employment benefits or protections. HomeJoy, a house cleaning and services platform, failed in part due to extensive lawsuits challenging the independent contractor classification of the workers performing the service.²⁹ Other times, ventures face challenges during the internationalization process from either not understanding cultural difference or adapting their business models to local norms—such as Groupon’s failed expansion into China when its business model could not adopt to different norms for revenue sharing.³⁰

26 Bluestein, Adam. 2017. “After a Comeback 23andme Faces its Next Test.” *Fast Company* ([Available Online](#))

27 Koren, Marina. 2019. “The Satellites that were Never Supposed to Launch.” *The Atlantic* ([Available Online](#))

28 “Swarm Technologies.” Crunchbase. Accessed March 29, 2020 at: https://www.crunchbase.com/search/funding_rounds/field/organizations/last_funding_type/swarm-technologies

29 Madden, Sam. 2015. “Why Homejoy Failed and the Future of the On-Demand Economy.” *TechCrunch* ([Available Online](#))

30 Zhu, Julia. 2011. “4 Mistakes behind Groupon’s Failure in China.” *Tech in Asia* ([Available Online](#))

- *Stakeholder Opposition:* New technologies often elicit concerns among stakeholder groups such as unions and human rights advocacy groups. Stakeholder opposition can come in many forms, with a goal to either shape a company's practices or to inflict financial and reputational damage. Civil society groups sometimes achieve this by running print and social media campaigns against a company. They can also engage in political advocacy to governments to block testing and deployment of technologies through lawsuits, filing complaints at regulatory agencies, and advocating to legislatures to change laws. In extreme instances, a well-coordinated stakeholder opposition campaign has the potential to be a 'category killer' through actively organizing to ban or turn public opinion against a technology. In 2020, 40 civil society groups signed a memorandum in support of a moratorium on the use of facial recognition technologies by U.S. law enforcement agencies³¹ -with active legislative campaigns running in multiple U.S. cities and states and the European Union. In that same year, facial recognition applications were being developed by more than 170 ventures³² and had a global market valued at \$9.6 Billion.³³
- **Governance:** Governance structures play an important role in ensuring overall management of ESG issues are well integrated across company functions. Ventures face several unique challenges in governance including:
 - *Board Size and Structure* Ventures have small boards typically consisting of founders and investors and fewer independent outside directors than public company boards.³⁴

31 Chen, Angela. 2020. "40 Groups have Called for a Moratorium on Facial Recognition Technology." *MIT Technology Review*. ([Available Online](#))

32 "Facial Recognition Companies." *Crunchbase* Accessed March 9, 2020 at: <https://www.crunchbase.com/hub/facial-recognition-companies#section-overview>

33 Allied Market Research. 2020. "Facial Recognition Market." ([Available Online](#))

34 Garg, Sam and Nathan Furr. 2017. "Venture Boards: Past Insights, Future Directions, and Transition to Public Firm Boards." *Strategic Entrepreneurship Journal* 11: 326-343. doi:10.1002/sej.1258

- *Board Committees and Expertise* Public company boards typically have directors and committees responsible for issues including legal, regulatory affairs, audit, risk, science & technology, and corporate social responsibility.³⁵
- *Board Diversity* Board diversity is a key driver of financial returns in public companies.³⁶ The venture capital industry lacks diversity both in investors (86% of partners of VC funds are male)³⁷ and in founders (80% of founder teams are all-male).³⁸
- *Policies, Codes of Conducts and Cultures* Ventures may not yet fully have internal policies and procedures in place necessary for good governance such as human resources and ethical sourcing. Additionally, corporate cultures inside ventures sometimes do not empower employees to speak up on concerns for safety or ethical issues.³⁹

The combination of lack of diversity among founder teams and board members, combined with fewer independent outside directors and a lack of board committees and internal corporate policies makes ventures vulnerable to a wide range of governance challenges, which research links to failures including:

- *Human Resources:* Strong human resources policies are required not only to recruit and retain talent but also to prevent costly lawsuits for bullying and sexual harassment.⁴⁰ Human resources is also important to establishing a culture and workplace norms for

35 Klemash, Steve, Kellie Huennekens, and Jamie Smith. 2018. "A Fresh Look at Corporate Boards." Harvard Law School Forum on Corporate Governance ([Available Online](#))

36 FCLT Global. 2019. "Predicting Long-term Success for Corporations and Investors Worldwide." ([Available Online](#))

37 Deloitte and NVCA. 2019. "Diversity and Inclusion in the VC Industry." ([Available Online](#))

38 Pitchbook and All Raise. 2019. "Women in the VC Ecosystem." ([Available Online](#))

39 For cases studies on venture failure and cultures see: "Culture Assessment Practice: Resources." Markkula Center for Applied Ethics. Accessed July 17, 2020 at: <https://www.scu.edu/ethics/culture-assessment-practice/resources-on-culture/>

40 Levin, Sam. 2017. "Startup Workers see Sexual Harassment on Breathtaking Scale in Silicon Valley." *The Guardian* ([Available Online](#))

success—several ventures have attributed employee overwork and burnout as a contributing cause to their failure.⁴¹

- *Ethical Sourcing*: For some ventures, especially those sourcing materials in consumer-facing brands such as clothing and food, having an ethical sourcing policy is needed from early stages to avoid costly missteps and brand reputation damage.⁴²
- *Ethical Marketing & Fair Competition*: In efforts to attain customers quickly, some ventures have engaged in mislabeling of products (Honest Company claimed that it was free of synthetic chemicals) or falsified sales data (Hampton Creek hired contractors to buy back its own products to drive up sales numbers to secure additional financing). In more extreme cases, start-ups have engaged in bullying and intimidation of their former employees and journalists investigating their activities.⁴³
- *Fraud & Embezzlement*: In extreme cases, a lack of governance has led to criminal activities. In the last decade, dozens of start-ups have been charged with defrauding investors with activities ranging from check forgery, falsifying documents, to siphoning company funds to pay for extravagant personal lifestyles.⁴⁴

41 CBInsights. 2019. "The Top 20 Reasons Why Startups Fail." (Available Online)

42 CDC Group and FMO. 2020. "Responsible Venture Capital." (Available Online)

43 CBInsights. 2019. "16 of the Biggest Alleged Start-up Frauds of all Time." (Available Online)

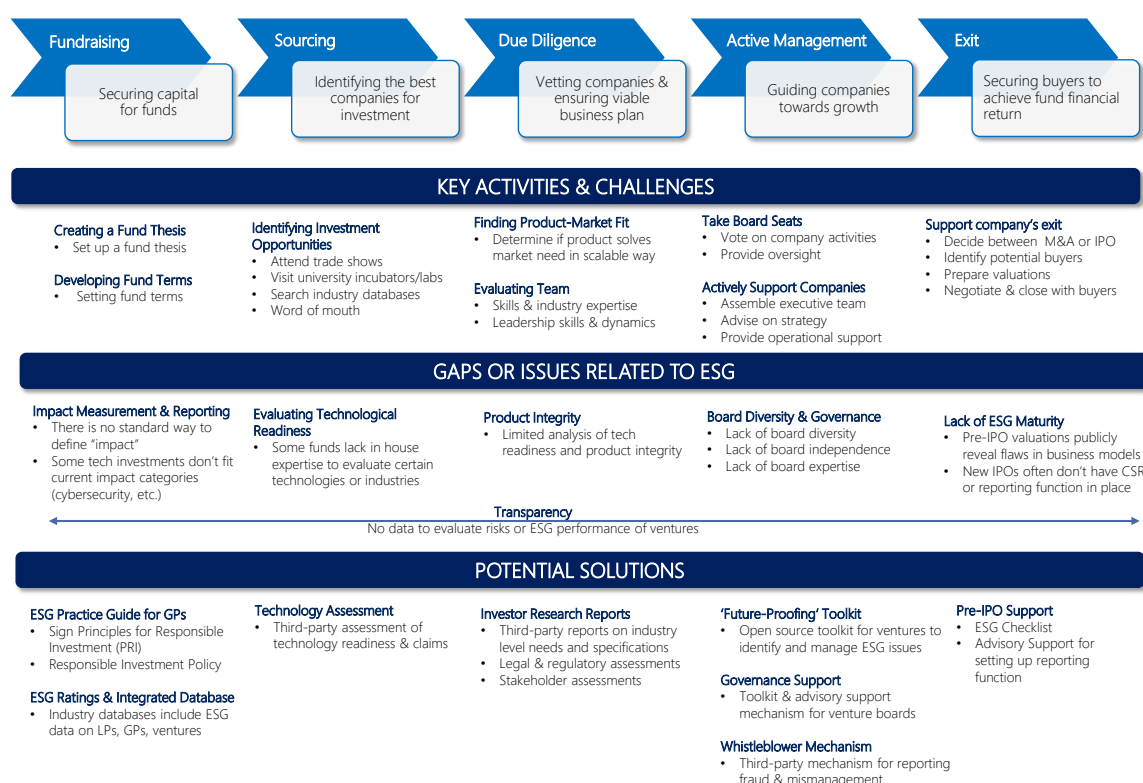
44 CBInsights. 2019. "16 of the Biggest Alleged Start-up Frauds of all Time." (Available Online)

3. Responsible Investing in Venture Capital Firms

Advancing responsible investment practices inside venture capital firms requires an integrated approach across all stages of the investment process. (See summary in **Figure 4**)

Figure 4. Venture capital firms: ESG Gaps and Potential Solutions

Source: Authors' analysis including summary of ideas from external reviewers. See text for citations to published works.



Fundraising

The first step of creating a new fund is to establish a fund thesis and raise funding from limited partners. This first stage has several opportunities to advance ESG including:

- The **Responsible Investment Policy** sets out⁴⁵ the firm's overall values and mission, commitment to integrate ESG factors to better manage risk and generate sustainable long-term returns and clear explanation of the relevance of ESG issues to firm's investment strategy. The execution of a responsible investment policy starts with assigning an executive to be responsible for overall oversight of the policy, who in turn forms a committee of legal, public relations, and staff members who support executive across the funds activities. The responsible investment policy can send clear signals both during the fundraising and the deal sourcing process that the fund has clear values and policies in place to minimize risks and treat parties fairly.
- The **Fund Thesis** lays out the overall objective of a fund. Sometimes funds develop a thesis of a problem they want to solve—such as advancing health care access and affordability. The fund thesis provides an opportunity for dialogue with LPs about the broader goals beyond financial returns.
- The **LP-GP contract and term sheet** sets the terms and conditions including target financial returns, management fees, and how profits from exits will be distributed. The LP-GP contract provides an opportunity for LPs to write conditions into the term sheet for ESG due diligence and reporting of major risks.⁴⁶ It may also be used as an opportunity to advance other goals such as greater diversity and inclusion in portfolio companies. Fees can be contingent on meeting defined ESG performance standards. Clawbacks can also be

45 For detailed guidance on setting fund-level policies see CDC Group and FMO. 2020. "Responsible Venture Capital." (Available Online) and BSR. 2019. "ESG in Private Equity: How to Write a Responsible Investment Policy." (Available Online)

46 For additional guidance on setting fund terms see: UNPRI. 2017. "Incorporating Responsible Investment Requirements into Private Equity Fund Terms." ([Available Online](#))

used for serious incidents such as fraudulent behavior or systemic sexual harassment.⁴⁷

Having a clear responsible investment policy, thesis, and ESG practice may support GPs in fundraising discussions. Venture Capital is a high-risk asset class –a minority of funds outperform stock market benchmarks in a given year.⁴⁸ This can lead to competition among LPs to get into the funds which have historically been most profitable—and placing the power to select among LPs into the hands of top-performing GPs.⁴⁹ On the flip side, newer funds without proven track records can face competition to raise funds from LPs.⁵⁰ Among smaller funds without long track records, including discussion on how they align with an LPs stated values and responsible investment policy may help them stand out in a crowded field.

Sourcing and Due Diligence

At sourcing stage, venture capital firms research potential opportunities, review pitches and directly approach companies in which they'd like to invest. Once a company has been identified for potential investment, the fund conducts due diligence. The due diligence is typically looked at in three parts: product, market, and team. Product looks at the overall potential of the product including its technical quality compared to other solutions in the space and its intellectual property status including patent filings. Market looks at the overall size and growth rate of market and position relative to the competition. Team looks at the track record and experience profile of the founders. For Late Stage VC investments, due diligence also occurs into company operations.

47 CDC Group and FMO. 2020. "Responsible Venture Capital." (Available Online)

48 As an example, of the 66 U.S. venture capital firms that began in 2008, in 2018 they had returned a pooled return to LPs of 11.7%. The top quartile of funds returned 18.1% while the bottom quartile returned 1.3%. See: Cambridge Associates. 2018. "US Venture Capital Index and Selected Benchmark Statistics." pg. 7 (Available Online)

49 For additional analysis see: Lenhard, Johannes. 2020. "The Ethics of Venture Investing: Why Have VCs not Engaged in ESG Experiments Yet?" *Medium* ([Available Online](#))

50 For example, since 2010, more than 2,000 new venture capital firms have been founded—and these funds held 47% of all funds raised in 2018. See: McKinsey & Company. 2019. "Private Markets Come of Age." pp.17-19. (Available Online) Since 2015, 'supersize rounds' of funding of \$1 Billion or more to one start-up have become more common—in 2018 supersize rounds accounted for 25% of the \$251 Billion in VC deal funding.

The sourcing and due diligence stages have multiple challenges that arise from time and resource constraints. Most venture capital fund returns come from a small number of portfolio companies. Around 70% of early-stage ventures fail within 20 months after first raising financing with around \$1.3M in total funding closed.⁵¹ In order for a fund to make its target return, this frequently requires that there be at least one large exit of more than \$1 Billion (a ‘unicorn’)⁵² and a few others with potential exits above \$500 Million.⁵³ These ventures are rare—with one study finding around 1% of seed stage companies eventually become unicorns⁵⁴—and likely even rarer, as one study estimated unicorns are on average overvalued by 50%.⁵⁵

- **Venture capital firms invest a lot of staff time and resources into sourcing the most promising ventures—and there can be significant competition to secure deals with the highest potential companies.** Due to the relatively small number of ventures with the potential for high exits, the competition between funds to secure these deals can be intense. Multiple factors go into the choice entrepreneur make including perceived prestige of the investors, deal terms, and support that will be provided. Some empirical research has shown that founders are more willing to accept funding from venture capitalists who are perceived as more ethical, as it signals that the founders will be treated fairly going forward.⁵⁶
- **The quick turnaround time on investments often does not give investors sufficient time to fully vet a technology or business model.** The process to identify companies and make decisions can sometimes be a chaotic rush over a period of a few weeks, whereby investors rely on their immediate network of contacts to quickly vet a technology and a market space in which they may have limited experience. In

51 CBInsights. 2020. “339 Startup Failure Post-Mortems.” (Available Online.)

52 Dean, Tomer. 2017. “The Meeting that Showed me the Truth about VCs.” *TechCrunch* (Available Online)

53 Dean, Tomer. 2017. “The Meeting that Showed me the Truth about VCs.” *TechCrunch* (Available Online)

54 CBInsights. 2019. “The Top 20 Reasons Why Startups Fail.” (Available Online) A list of unicorn start-ups is continually updated by Pitchbook: <https://pitchbook.com/news/articles/unicorn-class-of-2018>

55 Griffith, Erin. 2018. “Unicorns are Rare but Study Suggests They Should be Even Rarer.” *Wired* ([Available Online](#))

56 Farthing, Emma. 2020. “Why Venture Capital and Start-ups Should Consider Incorporating ESG into their Operations and Investments.” (Available Online)

some situations, this leads to pursuing investment opportunities without understanding all the facts and risks. To demonstrate the frenzied nature of investing in AI start-ups, a group pulled a prank at an international AI conference in 2016. They set up a website for a fake company ‘Rocket AI’ claiming to build a proprietary machine learning technology which was also fake—“Temporally Recurrent Optimal Learning”-TROL(L). The group then organized a large launch party for the company that had hundreds of attendees and received outreach for funding from five VC funds. One observer explained the purpose of the stunt: “Clever teams are exploiting the obscurity and cachet to raise more money, knowing that investors and the press have little understanding of how machine learning works in practice.”⁵⁷

Active Management

Venture capitalists typically play an active role in the ongoing management of a company by taking a board seat. They also sometimes provide other types of technical and operational support to ventures.

- **Boards:** Several challenges can arise at the board level including distribution of shares and voting power of different investors and between investors and founders.⁵⁸ This can lead to situations where there are conflicts in the goals of different investors, including conflicts when a company pivots to a business model or customers which are not in alignment with investor goals. Setting board level policies on corporate social responsibility and risk management can help get all investors in the syndicate on the same page of goals.
- **Support to Ventures:** Venture capital firms often provide support to ventures in the forms of introductions to potential customers, and support on talent recruitment. Funds have an opportunity to support on critical issues such as setting up risk management and responsible sourcing policies. Funds can also provide support to portfolio

⁵⁷ Tez, Riva-Melissa. 2016. “Rocket AI: 2016’s Most Notorious AI Launch and the Problem of AI Hype.” *Medium* (Available Online) Malanov, Alexey. 2017. “Rocket AI and the Next Generation of AV Software.” *Secure List* ([Available Online](#))

⁵⁸ CDC Group and FMO. 2020. “Responsible Venture Capital.” (Available Online)

companies as they are shutting down, ensuring employees, customers, and business partners are treated fairly during this process.⁵⁹

Exits




The exit process typically involves choosing between a buyout/M&A and an IPO. This process includes identifying potential buyers and negotiating on the overall valuation of the business. In the case of IPOs, valuations are prepared and made public for the first time. It is at this stage that the extent of any commercial or ESG challenges becomes transparent. Recently, this process has led to an unveiling of the extent of underlying issues of business models and governance among some of the most lauded venture success stories of the last decade. Both Uber and Lyft saw stock value declines between 30- 40% in the first four months after their IPOs due to failure to convince investors of a profitable business model. WeWork canceled its IPO once the extent of its financial and governance challenges were revealed- reducing its valuation in half.⁶⁰ This suggests that issues regarding governance and managing stakeholders must be surfaced and managed throughout the venture development process to ensure maximum value has been created for investors at exit.

59 CDC Group and FMO. 2020. "Responsible Venture Capital." (Available Online)

60 Root, Al. 2019. "Gig-Economy Unicorns WeWork, Uber, and Lyft Don't Match Up to Their Social-Media Predecessors." *Barron* ([Available Online](#))

4. Road Map: An Action Agenda to Advance Public Purpose in Venture Capital

Venture capital firms play a critical role in shaping the future of technology, industry and society through selecting and shaping the path for the next generation of global companies. This chapter looks at three challenges venture capital firms face in managing societal impacts and proposes solutions that could move the industry forward.

 Technology and Risk	 Data and Transparency	 Diversity and Culture
Future-Proofing Tools & Trainings Tools and trainings for VCs and founders to assess values, stakeholders, risks, and unintended consequences.	Ratings Third party scoring of ESG performance and other relevant data to public purpose	Diverse Fund Managers & Founders Increase diversity in VC firm and portfolio company leadership
Technology Assessments Independent evaluations of technological readiness, product-market fit, and societal impacts.	Interoperable Data Comparable data on ventures performance on ESG and public purpose issues	Ethical Culture Trainings for an ethical culture in VC firms and portfolio companies
Governance Support Tools for venture boards and whistleblowing mechanism.		

Action 1: Technology & Risk

Challenge: Venture capital is among the highest risk forms of investment. Yet the industry has no systematic approach to societal risk management. Among the most common types of risks investors in technology ventures face are uncertainty regarding readiness and performance of new technologies, stakeholder concerns such as achieving a product-market fit and regulatory compliance and governance concerns such as establishing board oversight and whistleblowing. Most societal risk management tools available today for investors address issues of mature companies or ESG challenges relevant to emerging markets.⁶¹ Current investor tools and available data on ventures do not fully address the issues specific to frontier technologies such as artificial intelligence, cybersecurity, data privacy, and technology-related concerns that impact inclusion, human rights, democracy, public safety, and other public purpose values.

Why it Matters: Societal risk management can help investors and founders surface concerns earlier and put in place better mechanisms to ensure a smooth execution—with an aim to have higher success rates across a portfolio and create higher value companies at exit.

Potential Solutions: A range of solutions could support the industry in developing better technology assessment and societal risk management practices including:

1. **Future-Proofing Tools and Trainings:** One potential solution is to develop tools and trainings for VCs and founders to better identify and manage societal impacts. These products could provide a series of exercises to complement analysis completed during the business plan and strategy development during early stages. The outcome should be to provide both founders and investors a more holistic picture of the overall opportunities and risks and a clear path for implementation.

⁶¹ For an example of an ESG toolkit for private equity-backed firms in emerging markets see: ESG Toolkit for Fund Managers. CDC Group. Accessed March 31, 2020 at: <https://toolkit.cdcgroup.com/>

Tools may include a societal due diligence checklist or sample term sheets, while trainings could focus on educating VCs, founders, product managers, designers, and others on how to evaluate societal impacts on frontier technologies. More specifically, these tools and trainings would help identify 1. Core Values 2. Key Stakeholders 3. Impacts 4. Material Issues 5. Top Risks and 6. Unintended Consequences of the technology.

In the future, these types of products could lead to the development of a ‘Ventures Balanced Score Card’ that would map the top 2-5 target outcomes for financial, technology, impacts, and risk management. (See **Annex 2 Future-Proofing Sample Exercises** for a concept and demo)

A precedent for these types of tools and trainings is Ethical OS and Ethical Explorer. These tools are designed for founders, product managers, and designers and cover risks and unintended consequences across multiple domains including surveillance states, bad actors, data monetization, algorithmic bias, user understanding, disinformation, technology addiction, and social and economic inequalities.⁶²

2. **Technology Assessments (TA):** A common challenge investors and founders face is finding a product-market fit.⁶³ This can arise for a variety of reasons including unclear understanding of a customer’s needs or failure to integrate the interests of the broader stakeholder ecosystem. Additionally, investors in frontier technologies also face a high risk of not accurately assessing a technology’s capabilities and limitations and the timeline required for readiness for the marketplace.

One solution is to establish an entity to commission and integrate findings from tech assessments with specific deep dives on product-market fit and risk. The purpose of this entity would be to serve as a one-stop clearinghouse for investors and founders

62 Omidyar Network. Accessed July 17, 2020 at: “Ethical OS.” <https://ethicalos.org/> and “Ethical Explorer” <https://ethicalexplorer.org/>

63 CBInsights. 2019. “The Top 20 Reasons Why Startups Fail.” (Available Online)

looking to build frontier tech products. (see **Annex 3-1 Technology Assessment** for an example of potential products)

Technology Assessments (TA) typically involve collecting views from a broad range of stakeholders including scientific experts, industry, government, and civil society. They then provide analysis into the current capabilities and limitations of a technology, timelines for readiness, potential use cases (technology transfer and diffusion), customer needs and existing solutions, stakeholder concerns and preferences, and options for the future.

The entity could produce various types of analysis including:

- *Technology*: Assessments into the capabilities and limitations, timeline for readiness, potential use cases, likely societal impacts and options, similar to many existing TA frameworks⁶⁴
- *Industry*: Assessments into the needs for technological solutions for each industry, performance standards, interoperability requirements, legal and regulatory status, and stakeholder concerns
- *Topics*: Deep dives into topic areas such privacy, surveillance, civil liberties, labor rights, and cybersecurity with clear guidance on options and their likely implications

Technology Assessments (TA) have historically been led by government agencies. For example, the U.S. Office of Technology Assessment (OTA) provided assessments to U.S. Congress until its defunding in the 1990s. Currently, the U.S. Government Accountability Agency (GAO) houses a specific group called the Science, Technology Assessment and Analytics (STAA) Team to conduct TA, provide technical services to Congress among many other functions.⁶⁵ Several European countries and EU Parliament

64 U.S. Government Accountability Office Technology Readiness Assessment Guide. Accessed July 30, 2020. <https://www.gao.gov/products/GAO-16-410G>

65 U.S. Government Accountability Office. Accessed July 30, 2020 at: <https://www.gao.gov/technology-and-science>

currently have TA bodies as do some international institutions such as the World Health Organization (WHO). Some precedents also exist for independent technology assessments led by non-profits and academic institutions. For example, The Cochrane Group produces ‘Plain Language Summaries’ of the latest scientific evidence for medical professionals to assist in treatment decisions.⁶⁶ One Mind Institute created Psyber Guide which provides independent third-party ratings of mental health apps for scientific validity, user experience, and data privacy and security practices.⁶⁷

3. **Governance Support:** Start-ups frequently do not have processes in place to handle grievances related to fraud, sexual harassment, or other compliance or illegal activities. One potential solution would be to create a governance support tool for venture boards to better address governance challenges specific to early stage and frontier technology companies. An alternative solution would be to establish an independent entity for venture capital-backed companies that could serve both as a whistleblowing reporting mechanism and a confidential support service to troubleshoot concerns with boards and investors.⁶⁸

Action 2: Data & Transparency

Challenge: Data is critical to investment decision-making and management. Public companies already have data from multiple independent ratings agencies and centralized databases reporting ESG performance. Data is currently available on financial and market performance of venture capital firms and portfolio companies in industry databases. However, there remains no independent assessment or reporting database for ESG or broader societal issues in ventures.

Why it Matters: Societal impact data on ventures can contribute to building an evidence base of which factors lead to better financial outcomes. For

66 The Cochrane Group. Accessed March 31, 2020 at: <https://www.cochrane.org/evidence>

67 PsyberGuide. Accessed March 31, 2020 at: <https://www.psyberguide.org/>

68 For an overview see: OECD. “Committing to Effective Whistleblower Protection.” ([Available Online](#)) .

LPs, ESG data can aid in the decision to select fund managers in line with their ESG commitments and provide a mechanism to monitor reputational risks. For GPs, ESG and other public purpose related data can help in the sourcing, due diligence, and management practices by giving comparable information on best practices within an industry.

Potential Solutions: Transparency can be improved by developing ESG ratings of ventures and integrating them into existing industry databases.

1. **Ratings:** The financial services industry has several ratings agencies which independently rate thousands of companies.⁶⁹ One example is JUST Capital, which rates over 800 public companies on performance on topics ranging from jobs, environment, customer service, and data privacy. Analysts also provide narrative descriptions on how each company was scored and on-going ESG improvement activities.⁷⁰ ESG ratings agencies could provide independent ratings of ventures which could be integrated into existing VC industry databases. This process would require mapping which issues are most material to each industry and developing standardized rating scales. (For an example of a potential rating scale for ventures see **Annex 3-2 ESG Ratings**) Among the types of material issues that could be scored are:

- *Technology:* The likelihood the venture will face challenges due to lack of technological readiness or intellectual property status
- *Stakeholder:* The likelihood the venture will encounter legal and regulatory challenges, stakeholder opposition, labor disputes, environmental degradation, or human rights violations
- *Governance:* The likelihood the venture will experience a crisis due to lack of governance and oversight stemming from issues in board structure, composition, diversity, or lack of internal policies

69 Sustainable Insight. 2016. "Who are the ESG Ratings Agencies?" ([Available Online](#))

70 JUST Capital. Accessed June 4, 2020 at: <https://justcapital.com/rankings/>

2. **Interoperable Data:** The venture capital industry has several databases including Pitchbook, CBInsights Mosaic, and Crunchbase. These databases provide detailed information including which LPs and GPs are funding ventures and some metrics into venture performance such as sales, number of employees, and trackers of media newsfeeds and sentiment analysis. These datasets could be expanded to include third-party data on ESG practices. (See **Annex 3-3 Interoperable Data** for a concept for an ESG overlay in an existing industry database.) Among the data that could be provided are:

- *Limited Partners:* LP-level data could include what exclusions and other ESG issues are considered in the VC fund manager evaluation process as well as information on thematic investing priorities.
- *General Partners:* GP-level data could include whether the fund is a UN Principles for Responsible Investment signatory, responsible investment policy, exclusions list, thematic investing funds (if any), and diversity & inclusion metrics for fund leadership and portfolio companies.
- *Ventures:* Venture-level data could be added incrementally by stage *Seed-Series*. A data could include whether a venture is classified under a specific thematic or impact fund category and the diversity of board and leadership team. Information could also be collected in narrative form from the company as to how they are addressing critical challenges for their technology class and industry such as controlling for algorithmic bias and working with regulators to address safety concerns. *Series B and beyond* data could include third-party ratings on material issues in addition to narratives from the company.

Action 3: Diversity & Culture

Challenge: Venture capital firms and founders receiving funding have high levels of underrepresentation of women and people of color. A 2016 survey by Deloitte of the U.S. venture capital industry found that 80% of partners are white and 86% are male.⁷¹ In 2018, only 20% of venture capital funding went to start-ups with at least one woman on the founder team.⁷² While the numbers have improved over recent years, a survey conducted by Morgan Stanley found that 3 in 5 U.S. venture capital firms report that increasing funding to diverse founders is not a top priority.⁷³ At the same time, increasing evidence has shown that company cultures inside venture capital-backed start-ups are often plagued by cultures of sexual harassment,⁷⁴ bullying, and disregard for safety and ethical concerns raised by both employees and external stakeholders.

Why it Matters: Diversity and inclusion is a proven driver of both better financial returns inside companies and long-term returns to venture capital firms.⁷⁵ Venture capital firms that increased their proportion of female partners by 10% experienced an average 1.5% increase in overall fund returns and had 9.7% more profitable exits.⁷⁶ Additionally, company culture has been shown to be an important driver for attracting and retaining top employees, building brands and consumer trust, and preventing serious incidents of mismanagement and fraud.⁷⁷

Potential Solutions: There are several solutions to improve diversity and culture in the venture capital ecosystem currently being implemented including:

71 Deloitte and NVCA. 2019. "Diversity and Inclusion in the VC Industry." ([Available Online](#))

72 Pitchbook and All Raise. 2019. "Women in the VC Ecosystem." ([Available Online](#))

73 Morgan Stanley. 2019. "Venture Capitalists are Missing Out on a Trillion Dollar Opportunity." ([Available Online](#))

74 Levin, Sam. 2017. "Startup Workers see Sexual Harassment on Breathtaking Scale in Silicon Valley." *The Guardian* ([Available Online](#))

75 DuBow, Wendy and Allison-Scott Pruitt. 2017. "The Comprehensive Case for Investing More VC Money in Women-Led Startups." *Harvard Business Review* ([Available Online](#))

76 Gompers, Paul and Silpa Kovvali. 2018. "The Other Diversity Dividend." *Harvard Business Review* ([Available Online](#))

77 Embroker. 2019. "A Start-up's Guide to Business Ethics and Social Responsibility." ([Available Online](#))

1. **Diverse Fund Managers & Founders:** Several initiatives are working to raise representation of women and people of color inside venture capital firm leadership and portfolio companies. All Raise is a non-profit advocating to advance women in venture capital and raise representation of female partners to 25% in the next five years.⁷⁸ Founders for Change tracks diversity inside venture capital firms and collects pledges from VCs to commit to more diverse hiring and investment.⁷⁹ Limited partners are also starting to consider diversity when selecting fund managers and are reporting diversity numbers. As an example, HarbourVest tracks and reports commitments made to funds with >25% female or diverse leadership.⁸⁰ Investors are also starting to place minimum requirements for diversity at exit. For example, Goldman Sachs announced it will no longer take companies public without at least one diverse board member (half of all IPOs in 2019 had all-male boards).⁸¹
2. **Ethical Cultures:** Some initiatives are working to improve culture in start-ups to ensure ethics is a core value that is reflected in product and people. Venture Forward, an initiative of the National Venture Capital Association, is providing standards and tools on managing diversity and harassment.⁸² The Markkula Center for Applied Ethics has developed a Culture Assessment Tool that organizations can use to help define their values, identify behaviors, set policies, and measure progress. The tool also includes case studies on culture change in both large organizations and ventures.⁸³

78 All Raise. Accessed March 31, 2020 at: <https://www.allraise.org/>

79 Founders for Change. Accessed March 31, 2020 at: <https://www.foundersforchange.org/>

80 HarbourVest Partners. "Diverse and Emerging Managers" in 2019 Annual ESG Report. Accessed June 4, 2020 at: <https://viewpoints.harbourvest.com/2019-esg-report/diverse-and-emerging-managers/>

81 Thorne, James. 2020. "Moves to Lift Board Diversity Highlight Inaction Among Private Companies." *Pitchbook* ([Available Online](#))

82 NVCA. "Diversity and Inclusion." Accessed March 31, 2020 at: <https://nvca.org/diversity-and-inclusion/>

83 "Culture Assessment Practice." Markkula Center for Applied Ethics. Accessed July 16, 2020 at: <https://www.scu.edu/ethics/culture-assessment-practice/>

Next Steps

This report provides a first high-level overview of challenges and potential solutions for investors and founders to integrate public purpose considerations in frontier technology ventures. The Technology and Public Purpose (TAPP) Project looks forward to continuing a dialogue with interested investors and others for future tools or research products in the area of engaging private sectors leaders for responsible technology development and commercialization.

Annexes

Annex 1—Key Concepts: Responsible Investing & Venture Capital

This annex provides a high-level overview of the fields of responsible investing and venture capital for those not already familiar with the topics, and includes: (1) The definitions and types of responsible investing, (2) the universe of environment, social, governance (ESG) issues and how they are prioritized, and (3) the types and stages of venture capital investments.

What is Responsible Investing?

Responsible Investing is defined as the practice to “incorporate environmental, social and governance (ESG) factors in investment decisions and active ownership.”⁸⁴ In recent years, responsible investing has become a norm among capital market investors. The UN Principles for Responsible Investment (PRI) was established in 2006 as a mechanism to coordinate and oversee commitments to responsible investing. As of 2018, there were over 1,900 signatories with \$89.6 Trillion in Assets under Management.⁸⁵ The signatories included major asset managers such as Blackrock, Vanguard, Fidelity, State Street and PIMCO. It also included many of the largest LPs in venture capital firms including CalPERS, HarbourVest Partners, and IFC.⁸⁶

84 PRI. “What is Responsible Investment?” Accessed June 5, 2020 at: <https://www.unpri.org/pri/an-introduction-to-responsible-investment/what-is-responsible-investment>

85 PRI. 2018. “Annual Report.” (Available Online)

86 UNPRI. “Signatory Directory.” Accessed June 12, 2020 at: <https://www.unpri.org/signatories/signatory-directory>

Types of Responsible Investing

There are several types of activities that fall under responsible investing (see **Figure A-1** for definitions). The types of activities that can be undertaken include:

- *ESG Screening*: Applying filters to what types of investments are made based on preferences or values. This can include excluding entire product categories (tobacco, weapons) or methods (animal testing, GMOs).
- *ESG Integration*: Including analysis on ESG issues to improve investment decisions and manage risk and returns (wage and working conditions in retail, water management in agriculture)
- *ESG Engagement*: Discussing ESG issues with companies and boards to improve handling of issues
- *Thematic Investing*: Creating investment funds with an intention to advance specific social or environmental goals (including impact investing)
- *Proxy Voting*: Proposing and voting on resolutions to formally express approval or disapproval of a social or environmental issue

ESG screening, integration, and engagement practices can be used across all types of venture capital firms regardless of fund thesis or return targets. There are also specialized venture capital ‘thematic investing’ funds that seek to advance specific social or environmental goals (clean energy, cybersecurity solutions, etc.) These funds include both ‘market rate’ returns and those with ‘below market rate’ returns. The scope of this paper covers ESG integration and engagement. This paper does not cover thematic investing including ‘impact investing’ or associated funds for ‘social venture capital’ and ‘venture philanthropy.’

Figure A-1. Types of Responsible Investing

CONSIDERING ESG ISSUES WHEN BUILDING A PORTFOLIO (known as: ESG incorporation)			IMPROVING INVESTEEES' ESG PERFORMANCE (known as: active ownership or stewardship)	
ESG issues can be incorporated into existing investment practices using a combination of three approaches: integration, screening and thematic.			Investors can encourage the companies they are already invested in to improve their ESG risk management or develop more sustainable business practices.	
Integration	Screening	Thematic	Engagement	Proxy voting
Explicitly and systematically including ESG issues in investment analysis and decisions, to better manage risks and improve returns.	Applying filters to lists of potential investments to rule companies in or out of contention for investment, based on an investor's preferences, values or ethics.	Seeking to combine attractive risk-return profiles with an intention to contribute to a specific environmental or social outcome. Includes impact investing.	Discussing ESG issues with companies to improve their handling, including disclosure, of such issues. Can be done individually, or in collaboration with other investors.	Formally expressing approval or disapproval through voting on resolutions and proposing shareholder resolutions on specific ESG issues.

Source: PRI. "What is Responsible Investing?" Accessed June 5, 2020 at: <https://www.unpri.org/pri/an-introduction-to-responsible-investment/what-is-responsible-investment>

Environment, Social, and Governance (ESG) Issues

ESG encompasses many types of issues including:

- *Environment:* Management of the natural environment including water, air, deforestation, biodiversity, pollution, waste management, and carbon emissions
- *Social:* Management of stakeholders including employees, customers, suppliers, communities, and government relations
- *Governance:* Management of boards and corporate policies covering executive compensation, shareholder voting rights, anti-corruption, bribery and prevention of fraud and mismanagement

The Sustainability Accounting Standards Board (SASB) was created in 2011 to develop standards for each ESG issue and industry. The standards are set based on empirical evidence for which issues drive financial returns in an industry - and an extensive process of harmonizing international legal and regulatory frameworks, industry guidelines, and stakeholder consultations.⁸⁷ (see **Figure A-2**)

87 SASB. 2017. "SASB Conceptual Framework." ([Available Online](#))

Figure A-2. SASB Universe of Sustainability Issues



Source: SASB. "Why is Financial Materiality Important?" Accessed June 5, 2020 at: <https://www.sasb.org/standards-overview/materiality-map/>

What is Venture Capital?

Venture capital is an asset class that makes equity investments in new companies. Venture capital firms typically look for new or disruptive business models with high long-term growth potential. New ventures typically require 5-8 years (but can be shorter or longer) to reach maturity for exit. Funding typically comes in rounds every 1-2 years as companies meet milestones.⁸⁸ (See **Figure A-3** for venture capital stages).

⁸⁸ National Venture Capital Association. "What is Venture Capital?" Accessed June 5, 2020 at: <https://nvca.org/about-us/what-is-vc/>

FigureA-3. Venture Capital Investment Stages

Venture Capital Plays a Vital Role in a Startup's Growth



Source: National Venture Capital Association. "What is Venture Capital?" Accessed June 5, 2020 at: <https://nvca.org/about-us/what-is-vc/>

Each round often involves new venture capital firms joining a syndicate, with shares allocated based on an agreed valuation.⁸⁹ Venture capital firms make money from management fees paid by limited partners (typically around 2% assets under management) and through carried interest (typically around 20%) upon exit via M&A, buyout, or IPO.⁹⁰ Venture capital firms raise money from a mix of institutional funds such as pensions, fund of funds, university endowments, foundations, insurance companies, international financial institutions, sovereign wealth funds, family offices and high net worth individuals.⁹¹

⁸⁹ Ibid.

⁹⁰ Takatkah, Ahmed. 2019. "VC Funds 101: Understanding Venture Fund Structures, Team Compensation, Fund Metrics and Reporting." ([Available Online](#))

⁹¹ A list of the largest LPs and GPs in venture capital worldwide is available in: Prequin. 2017. "The Venture Capital Top 100." ([Available Online](#))

Annex 2: Future-Proofing Sample Exercises

CASE STUDY (hypothetical)



STAGE: Series A

FUNDING RAISED: \$12 Million

EMPLOYEES: 14

PRODUCT DESCRIPTION: MindSolutions is transforming diagnosis and treatment of mental health problems through digital technologies. It leverages data from your smartphone and wristband activity trackers (incl. Apple Watch and Fitbit) to track your mood patterns and provide additional insights into your mental health to you and your therapist.

TECHNOLOGIES:

AI Solution: Generative AI model that predicts future behaviors and generates warnings and flags for mental state changes (including suicide risk score) which it sends to therapist.

Data Collected :

- Self-reported data (daily mood survey)
- Sleep and Physical Activity (accelerometer and gyroscope)
- Location and Movements (GPS)
- Meta-data on email, messaging and calls
- Social media posts (affective content in words and images)
- Credit card activity (spending levels)
- Car: speed (speeding levels)

Sensors: Phone Microphone: Voice Content and Acoustics (speed, volume, etc.); Wristband: Photoplethysmography, Pulse Oximetry

BUSINESS OVERVIEW:

- **CUSTOMERS:** Hospitals systems and payers in mental health care
- **BUSINESS MODEL:** Product subscription made via hospital systems with reimbursement from payers (Insurance Companies and Medicaid)

KEY BUSINESS CHALLENGES:

- **TECHNOLOGY & PRODUCT:** Collect best data possible for each data stream and ensure machine learning model works
- **MARKET:**
 - Demonstrate **unique value proposition** in accuracy levels in mental status predictions and improved patient outcomes;
 - Prove **product-market fit** in an increasingly crowded field of mental health AI-solutions providers
 - Develop **pricing strategy** that aligns to cost-savings realized by payer
 - Execute successful **first partnership** with major hospital system to pilot test product
- **FINANCIAL:** Demonstrate high potential for **revenue growth** and pathway to **profitability**

ESG QUESTIONS:

Short-Term Concerns (Series A-B):

- What **compliance** issues apply to our product with FDA, HIPAA, CCPA, GDPR?
- What should be our **data privacy & security** policy? Should users be allowed to restrict certain data to share with their medical provider and insurers?
- Should our product be opt-in **consent** only or should health care systems require patients to use it as condition of care?
- How do we manage stakeholder concerns about the **transparency** of our algorithms?

Future Concerns (Series C and beyond):

- Could we pivot/expand our product offerings to serve other **use cases** such as law enforcement agencies, employers and direct to consumer apps? What actions would we need to take today in anticipation of this possibility?
- What should be our **third-party sales** policy of user data?
- How would our product need to adapt to **international cultures and laws**?

FUTURE PROOFING EXERCISE: Overview

	GOAL	STEPS	OUTPUT
 STEP 1: VALUES What values guide our business decisions?	Establish clear values to guide business decisions	1. Create vision 2. Create mission statement 3. Create values	Values
 STEP 2: STAKEHOLDERS Which relationships do we most need to manage?	Understand key stakeholders and their expectations	1. Identify stakeholders 2. Clarify expectations 3. Develop action plan	Stakeholder Assessment
 STEP 3: IMPACTS What positive impacts do we want to have?	Identify positive impacts to industry or society	1. Identify target impacts 2. Create metrics	Impacts & Metrics
 STEP 4: MATERIALITY Which issues do we most need to manage?	Identify top issues that impact business and societal outcomes	1. Create list of material issues 2. Create materiality matrix 3. Develop action plan	Materiality Assessment
 STEP 5: RISKS What situations could most disrupt our business?	Identify and mitigate top risks to business and society	1. Create list of potential risks 2. Assess likelihood + impact 3. Develop mitigations	Risk Assessment
 STEP 6: UNINTENDED CONSEQUENCES What unintended impacts could result?	Explore possible future uses and their implications	1. Explore causality chains 2. Explore new users/features 3. Identify actions	Futures Analysis
 STEP 7: BALANCED SCORECARD What is our path forward?	Develop priority actions	1. Identify top goals 2. Clearly communicate goals	Balanced Scorecard

STEP 1. VALUES



What values guide our business decisions?

1. CREATE VISION

- Develop vision statement for company that explains the positive impact to industry and society



The **VISION** of MindSolutions is to...
...transform diagnosis and treatment of mental health challenges through the use of Emotion AI technologies making care more accessible, affordable, and effective

2. CREATE MISSION STATEMENT

- Describe the specific steps to achieve vision in bullets
- Consider which key stakeholders were mentioned and which were not (see Step 2) and revise if necessary



Our **MISSION** is to....
- Support patients in improving their mental health through gaining greater insight into their daily choices
- Provide doctors with cost-effective solutions to better manage patients

3. CREATE VALUES

- Brainstorm long list of potential values (teamwork, respect, transparency, etc.)
- Have team vote for top 3-5 values
- Write sentence on what that value means in action
- Consider which material issues, risks, and unintended consequences are not addressed in the values (see Steps 4–6) and revise if necessary
- Integrate vales into company practices, policies, and procedures including:
 - Hiring, compensation, promotions
 - Business model, pricing, competitive strategy
 - Product design and features
 - Customer terms of service



Our **VALUES** are....
- Compassionate care for patients
- Honesty and transparency about our products
- Teamwork and respect for our employees and partners

Additional Resources on Values

Workshop: Company Values Workshop ([Link](#))

STEP 2. STAKEHOLDERS



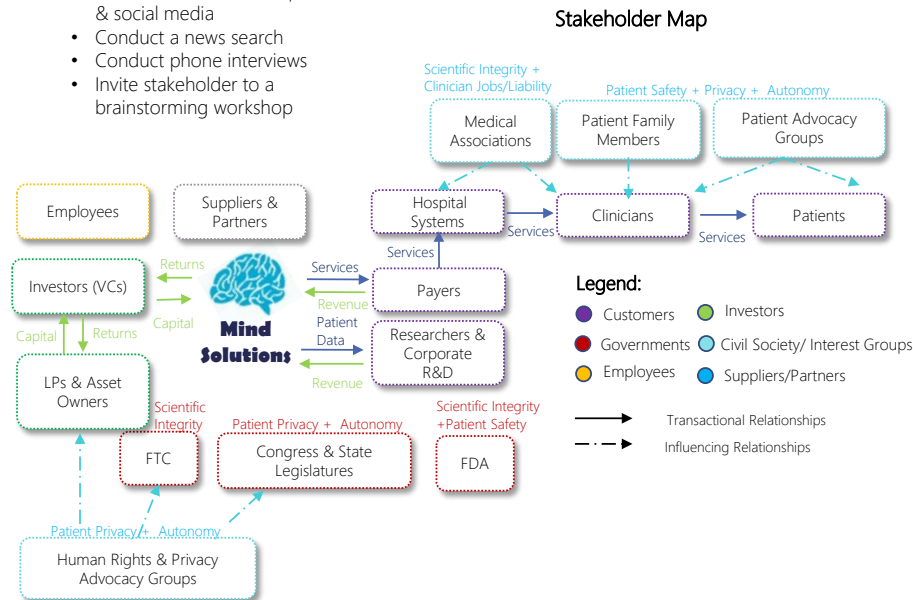
Which relationships do we most need to manage?

1. CREATE STAKEHOLDER LIST

- Brainstorm a long list of stakeholders
- Identify current or likely support level for product/company
- List expectations for company/product or issues of concern
- When issues of concern are unclear:
 - Read website, annual reports & social media
 - Conduct a news search
 - Conduct phone interviews
 - Invite stakeholder to a brainstorming workshop

2. CREATE STAKEHOLDER MAP

- Map stakeholders on a whiteboard
- Identify key transactional relationships to company
- Identify influencing relationships

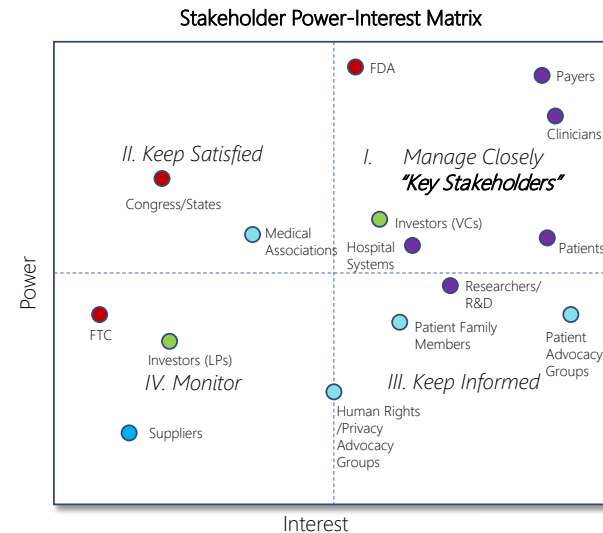


3. CREATE POWER-INTEREST MATRIX

Map each stakeholder by their level of:

- Power:** How much power does this group have to impact our organization's objectives?
High to Low: Approve/Ban product – Increase/restrict business opportunities – Influence brand reputation to customers – Influence public perception – Limited/None

- Interest:** How much interest does this group have in the activities of our organization?
High to Low: Strategic Priority – Mission-Aligned but Not Priority – Avoid Major Controversies Only – Limited/Commercial Only



STEP 2. STAKEHOLDERS (contd.)



4. DEVELOP STAKEHOLDER ACTION PLAN

- Consider options in *Stakeholder Actions List*
- Propose action to address concerns of each stakeholder
- Assign an employee responsible and due date for each action

Key Definitions:

Stakeholder: 'any group or individual who can affect or is affected by the achievement of the organization's objectives' (Freeman, 1984)

Trust: 'a bet stakeholders place that an organization will deliver against their positive expectations' (Edelman, 2019)

Stakeholder Action Plan

Group	Support Level	Expectations/ Issues of Concern	Action
FDA	?	<ul style="list-style-type: none"> • Patient Safety • Scientific Integrity • Regulatory Approval 	<ul style="list-style-type: none"> • Hire regulatory affairs consultant
Patient Advocacy Group #2	●	<ul style="list-style-type: none"> • Patient Privacy – third party data sales • Patient Autonomy – opt-out policy compulsory treatment 	<ul style="list-style-type: none"> • Develop third-party data sales policy • Develop patient consent and opt-out policy
Physician Association #1	●	<ul style="list-style-type: none"> • Scientific Integrity • Patient Safety • Physician Liability • Physician Jobs (workload, wages, job security) 	<ul style="list-style-type: none"> • Publish piece on algorithmic transparency in newsletter • Host workshop for dialogue/product feedback at annual conference

● Support ● Mixed/Caveats ● Oppose ? Unknown

Stakeholder Actions List

Stakeholder Salience Level	Action Options
I. Manage Closely ("Key Stakeholders")	<ul style="list-style-type: none"> -Representation in boards and advisory committees -Include in market research, product design
II. Keep Satisfied	<ul style="list-style-type: none"> -Engage on issues of specific concern, as requested -Consult on specific issues, as needed
III. Keep Informed	<ul style="list-style-type: none"> - Give consideration to concerns in product/policies - Engage in dialogue as requested or needed -Identify potential promoters/good will ambassadors
IV. Monitor	<ul style="list-style-type: none"> -Monitor trends on concerns over time -Share information by general communications (web, newsletter, social media)

Additional Resources on Stakeholders

Toolkit: StakeholderMap.com ([Link](#))



STEP 3. IMPACTS

What positive impacts do we want to have?

1. DEFINE TARGET IMPACTS

- Identify which global challenges the company helps to address (if any)
Look up goals on **SDG Compass**: sdgcompass.org
- Identify top 2-5 key stakeholders (see Stakeholder Assessment)
- Define target impacts for each stakeholder

2. SET METRICS

- Create metrics to measure progress

Impacts & Metrics

Key Stakeholder	Target Impact	Metrics
Patients	<ul style="list-style-type: none">Patient OutcomesQuality of Life (QoL)Patient Satisfaction	<ul style="list-style-type: none">% reporting improved symptoms% reporting improved QoL% patients satisfied with service
Clinicians	<ul style="list-style-type: none">Health OutcomesQuality of Care	<ul style="list-style-type: none">% patients with improved outcomes% clinicians satisfied with service
Payers	<ul style="list-style-type: none">Cost Savings	<ul style="list-style-type: none">% cost savings in mental health benefits claims

Sustainable Development Goals (SDGs)



Additional Resources on Impacts

Toolkit: SDG Compass ([Link](https://sdgcompass.org))

STEP 4. MATERIALITY

Which issues do we most need to manage?

1. CREATE MATERIAL ISSUES LIST

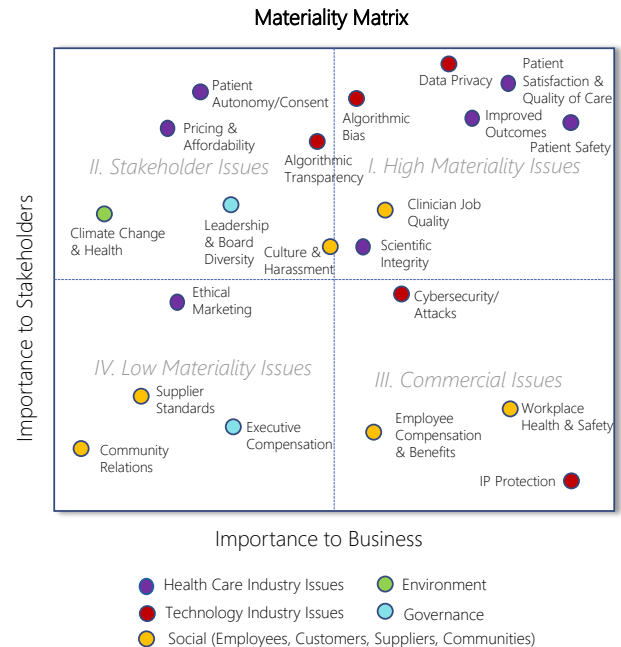
- Create a long list of potential material issues, using existing resources:
 - SASB Materiality Map** <https://materiality.sasb.org/>
Review material issues list for each industry in which company operates:
(1) *Health Care Sector* – Medical Equipment & Supplies, Managed Care, Health Care Delivery
(2) *Technology & Communications Sector* – Software & IT Services
 - Principled AI Map** for artificial intelligence solutions ([Link](#))
 - Stakeholder Assessment** – List issues from stakeholder concerns which were not already included
- Rate issues as Material, Potentially Material or Not Material

Material Issues List			
Health Care Industry Issues	<i>Medical Equipment & Supplies</i> Product Safety ✓ Ethical Marketing ✓ Product Lifecycle ✓ Affordability & Pricing Supply Chain Anti-Bribery	<i>Managed Care</i> Customer Privacy Standards ✓ Improved Health Outcomes ✓ Plan Coverage Climate Change & Health Plan Performance Accounting Metrics/Fraud	<i>Health Care Delivery</i> Patient Privacy & Electronic Records ✓ Patient Satisfaction & Quality of Care ✓ Pricing & Billing Transparency Employee Recruitment & Retention Employee Health & Safety Access for Low Income Patients Fraud & Unnecessary Procedures Controlled Substances Energy & Waste Management
Technology Industry Issues	Data Privacy ✓ Data Security ✓ IP Protection ✓	Employee Diversity & Inclusion Competitive Behaviors Freedom of Expression	Environmental Footprint of Hardware Systemic Risks from IT Disruptions
Artificial Intelligence Issues	Privacy ✓ Accountability ✓ Safety & Security ✓	Fairness and Non-Discrimination (Bias) ✓ Human in Loop ✓	Transparency & Explainability ✓
Stakeholder Issues	Scientific Integrity ✓ Clinician Liability ✓ Clinician Job Security ✓	Board Diversity ✓ Clinician Workload ✓ Patient Autonomy/Consent ✓	Culture & Sexual Harassment Executive Compensation Community Relations

Material ✓ Potentially Material Not Material

2. CREATE MATERIALITY MATRIX

- Plot each issue on a Materiality Matrix by importance to stakeholders and importance to meeting business objectives



STEP 4. MATERIALITY (contd.)



3. DEVELOP MATERIAL ISSUE ACTION PLAN

- Develop an action plan for each issue
- Assign individual responsible and timeline for action (short term, future growth stage)

Material Issue Action Plan

Material Issue	Issue Type	Materiality Level	Actions
Patient Satisfaction & Quality of Care	Health Care - Delivery	I. High	<ul style="list-style-type: none"> • Host multiple focus groups with patients & clinicians during pilot • Establish a patient and clinician continual feedback mechanism
Board Diversity	Governance	II. Stakeholder	<ul style="list-style-type: none"> • Recruit at least 2 female and diverse board members before Series B closing • Recruit independent advisor on patient rights
Algorithmic Transparency & Explainability	Technology – AI	II. Stakeholder	<ul style="list-style-type: none"> • Prepare statement for website on algorithm inputs and predictions: Confidence Levels, Error Rates, Crisis Response Policy

Key Definitions:

Materiality is “a concept that defines why and how certain issues are important for a company or a business sector. A material issue can have a major impact on the financial, economic, reputational, and legal aspects of a company, as well as on the system of internal and external stakeholders of that company.”

– Datamaran: “Materiality Definitions: The Ultimate Guide” ([Link](#))

Material Issue Action Options

Materiality Level	Action Options
I. High Materiality Issues	<ul style="list-style-type: none"> -Give extensive consideration in product design and business model -Develop policies and public statements -Develop risk management plan and mitigations
II. Stakeholder Issues	<ul style="list-style-type: none"> -Prepare strategy to remedy any concerns over time -Develop communications plan to respond to stakeholder requests
III. Commercial Issues	<ul style="list-style-type: none"> -Integrate concerns into business plan -Develop risk management plan and mitigations -Review list at next growth stage for new commercial issues
IV. Low Materiality Issues	<ul style="list-style-type: none"> -Give basic consideration in products and company operations -Review list at next growth stage for new business and stakeholder concerns

Additional Resources on Materiality

- Guide: Sustainability Accounting Standards Board (SASB) ([Link](#))
- Workshop: Session Lab Materiality Workshop Guide ([Link](#))
- Toolkit: CDC Group ESG Toolkit for Fund Managers ([Link](#))
- Example: Unilever’s Materiality Report ([Link](#))

STEP 5. RISK

What situations could most disrupt our business?



1. CREATE LIST OF RISKS

- Brainstorm long list of disruptive scenarios for each stakeholder group, issue area, and commercial concern (pricing, competition, etc.)
- Rate each risk by likelihood it will happen and the impact to the business if it occurs

2. DEVELOP MITIGATION MEASURES

- Develop list of mitigation options
- Prioritize by timeframe to implement
- Assign responsibility to team member
- Review risks annually for new trends or issues

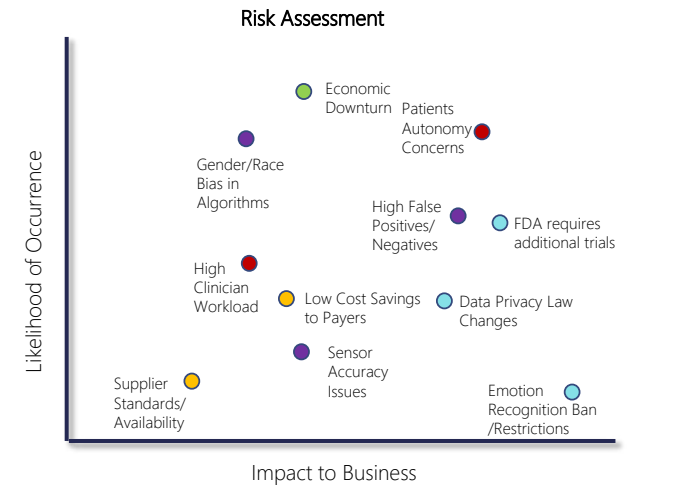
Risk Mitigation Plan

Scenario	Type	Issue	Likelihood	Impact	Mitigation Measure
Algorithm has too many false positives or negatives for suicidality	Technology	Scientific Integrity	3.5	4.0	<ul style="list-style-type: none"> • Create algorithmic audit • Create crisis response system
Patients refuse to use service because of continual monitoring	Stakeholders	Patient Autonomy	4.0	4.0	<ul style="list-style-type: none"> • Conduct patient focus group on product features • Develop clear data sharing/resale policy
Clinicians are given patient load that is too high to monitor	Stakeholders	Clinician Jobs	3.0	2.5	<ul style="list-style-type: none"> • Ask question in annual survey from clinicians • Facilitate dialogue with hospital systems if necessary
Smart watch supplier enters into exclusive agreement with competitor	Commercial	Competition	2.0	1.5	<ul style="list-style-type: none"> • Maintain relationships with multiple potential suppliers
Emotion detection AI technologies are banned	Political	Law Change	1.5	4.5	<ul style="list-style-type: none"> • Maintain communications with major AI ethics advocacy groups

Low

Medium

High



Likelihood	Impact
5 Almost Certain	Catastrophic
4 Likely	Critical
3 Probable	Moderate
2 Unlikely	Marginal
1 Rare	Negligible

Legend:

- Technology (Purple)
- Economic (Green)
- Stakeholders (Red)
- Political/Regulatory (Light Blue)
- Commercial (Yellow)
- Natural Disaster (Dark Blue)

STEP 6. UNINTENDED CONSEQUENCES

What unintended impacts could result?

PART 1 – DIRECT EFFECTS

What unintended effects could result from adoption of our product?

1. LIST IMPACTS

List 'Target Impacts' from Step 3.

Target Impact	
Patients	<ul style="list-style-type: none"> • Patient Outcomes • Quality of Life (QoL) • Patient Satisfaction
Clinicians	<ul style="list-style-type: none"> • Quality of Care
Payers	<ul style="list-style-type: none"> • Cost Savings

2. MAP CAUSAL CHAINS

Map variables and causal chains to each target impact

What variables drive patient outcomes?

Var. 1 Family Support & Involvement

Engaging family in patient recovery process through sharing information

Var. 2 Etc.

+

+/- Double Effects

-

User Intentions

3. MAP CONSEQUENCES

Map the chain of potential consequences

What are the first order consequences?

Family Awareness & Understanding

Physical/Emotional Abuse (or Family Enmeshment)

Time Delay

What are the second order consequences?

Etc.

Etc.

Long-Term Disability/Dependency

Scaling Effect

Health Care Costs
Unemployment Rate

Etc.

4. IDENTIFY POTENTIAL ACTIONS

Identify actions that could increase desired and reduce undesired effects

Option 1: User Restriction

➤ Product only available for adults age 18+

Option 2: Clinician Data Control

➤ Clinician controls what data is shared with family

Option 3: Patient Data Control

➤ Patient controls what data is shared with family (adult)

Option 4: Company Data Control

➤ Company only shares certain data with clinician, patient and/or family

Key Definitions:

Unintended Consequences: outcomes of a purposeful action that were not intended or foreseen

Common Causes: (partial list)

- **Complex Causal Chains:** incorrectly identifying the variables or causal links that determine outcomes (parenting choices and life outcomes)
- **Double Effects:** the effect has mixed or contradictory outcomes (CCTV cameras can both deter and increase juvenile delinquent behavior)
- **Scaling Effects:** the effect is only realized after reaching a certain critical mass (short-term rentals and gentrification)
- **Interaction Effects:** the effect is realized when an outside variable is present
- **Time Delay:** the effect is only realized after a gap in time (dust exposure and cancer in 9/11 first responders)
- **User Intentions:** incorrectly assessing actions of diverse users and those with malevolent intentions (children and bullies using social media platforms)

STEP 6. UNINTENDED CONSEQUENCES (contd.)

PART 2 – SPILLOVER EFFECTS

What unintended effects could arise from our technology being adopted across the broader ecosystem?



1. USE CASES

Who else might want to use our product? To what ends?

Brainstorm long list of potential use cases

- Police (crime prediction)
- Parents (child monitoring)
- Schools (admissions decisions)
- Political campaigns (voter prediction)
- Sales Teams (advertising)



2. SCIENTIFIC DISCOVERIES

What new scientific discoveries could advance capabilities of our product?

Identify new breakthroughs or analytical models which would advance feasibility

- Criminal Behavior Prediction
- Academic Achievement Prediction
- Voter Behavioral Analytics Profiles
- Genetic Polygenic Risk Profiles for Behavior and Personality



3. INTERFACING TECHNOLOGIES

With which other technologies could our product interface?

Brainstorm long list of technologies with which product could interface

Mature Technologies

- Body Cameras
- Drones
- Smartphone Apps
- CCTV
- Digital Assistants/IoT

Emerging Technologies

- Facial Recognition
- Biometric Remote Sensors
- Smart Robotics
- Neurotech Wearable Headsets (EEG, tDCS)
- IoT Devices



4. NEW PRODUCTS

What new products could then be created?

Brainstorm customer solutions for each use case

Customer: Police: Crime Prediction & Prevention



Solution: Smart Robotic Patrols

Ambulatory robots and drones with facial and biometric recognition capabilities that alert police to activity of individuals who are agitated and/or match a 'high risk offender' score in a database



5. CONSEQUENCES

What would be the consequences if this product were to become pervasive in society?

Brainstorm societal benefits and drawbacks

Benefits:

- Lower crime
- Taxpayer cost savings



Public Safety
Economic Prosperity

Drawbacks:

- Civil Liberties (freedom of movement)
- Social Inequalities (higher arrest/incarceration rates of minorities due to bias)



Social Cohesion



6. ACTIONS

What actions could we take today?

Determine which actions to take today in anticipation of potential consequences. Options include:

Customers

- Exclude entire use case
- Exclude sales to high risk customers
- Commit to training & support for customers
- Contractual clawbacks for abuses

Products

- Data practices
- Product features
- Community Standards
- Terms of Use

Policy & Governance

- Participate in industry standards-setting group
- Dialogue with civil society
- Dialogue with policymakers

Additional Resources on Unintended Consequences

Workshop: 4 Steps to the Future ([Link](#))

Toolkit: Ethical OS ([Link](#))



STEP 7. VENTURES BALANCED SCORECARD

What is our path forward?

Instructions :

- Add top 3-5 priorities from Futureproof Exercise + Business Plan
- Distribute at board & advisory committee meetings
- Hang posters and reference during meetings
- Review & update scorecard annually

3. IMPACTS TO ACHIEVE

How we create value for key stakeholders

Goal	Actions
Patients: High satisfaction and reduce symptom severity	Track satisfaction and adjust algorithms
Clinicians: Improve outcomes of patients	Assess 360 review of all providers interacting with platform
Payers: Substantial savings from reduced outpatient visits & hospital days	Encourage outcomes- based reimbursements

1. MARKET & FINANCIAL

How we build a viable business

Goal	Actions
Grow Market Share	Solve customer need early; gain high visibility organizations for first clients
Attain Profitability	Identify and target high value customers
Achieve high Growth Rate	Identify market segments with rapid growth potential and secure first major client
Build Team	Recruit leading industry practitioners and develop strong company culture

4. HARMS TO AVOID

How we manage top risks

Goal	Actions
Protect Patient Privacy	Develop clear third-party data sharing policy and secure database
Protect Patient Autonomy	Opt-in service only (no compulsory use as condition of treatment)
Protect Patient Safety	24-hour monitoring & on-call support by licensed clinicians
Manage Clinician Job Quality	Collect and act on continual feedback from clinician satisfaction surveys

2. TECHNOLOGY & PRODUCT

How we build a great product




Goal	Actions
Great User Experience	Host regular patient and clinician focus groups Act swiftly on user feedback
No Bias	Diverse data training sets, diverse pilot study participants and regular audits
High Accuracy	Annual audit with independent group



MindSolutions

Annex 3: Research, Data, and Reporting Sample Tools

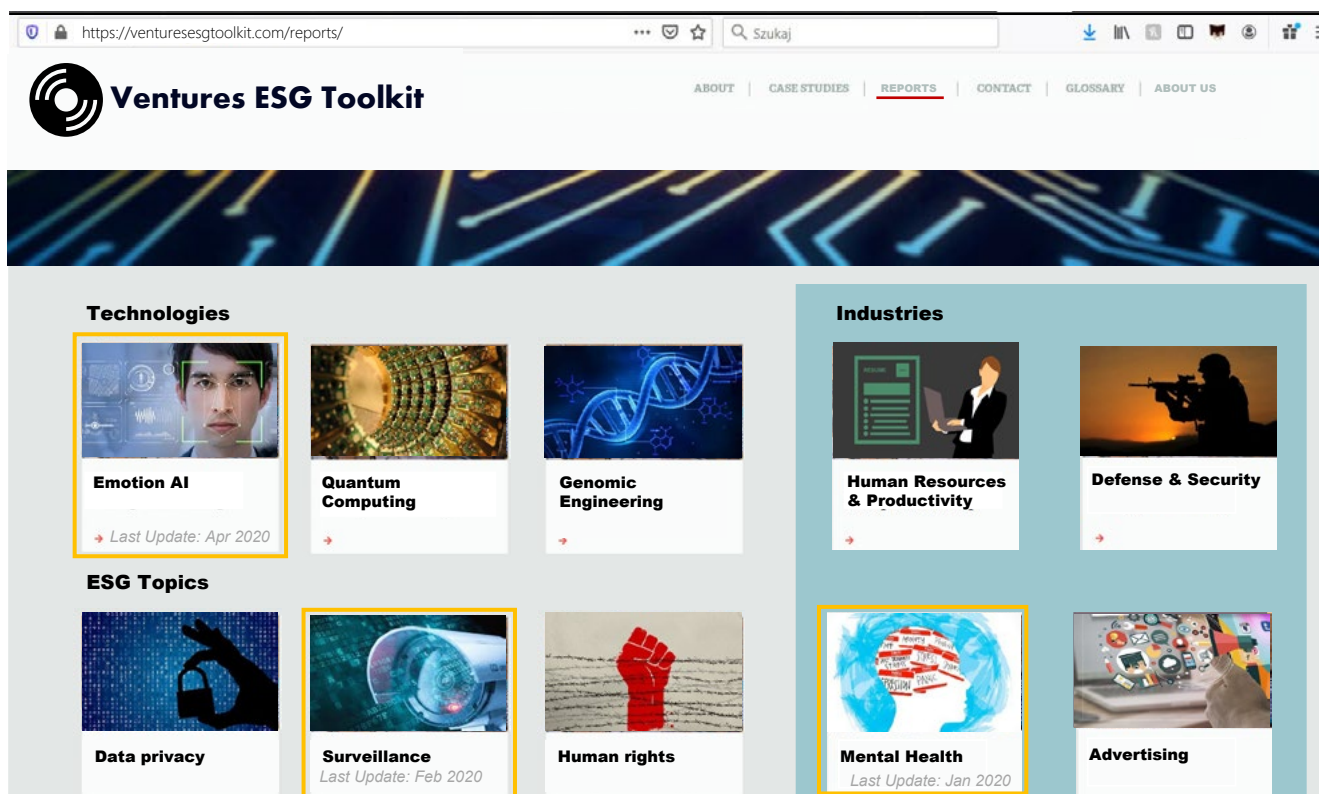
Investor Tools: Overview

		GOAL	ATTRIBUTES	OUTPUT
	INVESTOR RESEARCH PRODUCTS	Expert guidance for evaluating technical and societal issues	<ol style="list-style-type: none"> 1. Technology assessments 2. Stakeholder analysis 3. DDQs and Action options 	Research Reports
	ESG RATING SCORES	Independent scoring of venture performance in managing material issues	<ol style="list-style-type: none"> 1. Expert reviews 2. Actionable insights 3. Comparable data 	ESG Ratings
	INTEROPERABLE DATA	Industry databases with integrated financial, market, and ESG data on ventures	<ol style="list-style-type: none"> 1. Searchable by scores 2. Comparable scores by industry 	Database



Tool 1 INVESTOR RESEARCH PRODUCTS

Research reports could provide investors and entrepreneurs insights to material issues and stakeholders



Tool 1 INVESTOR RESEARCH PRODUCTS (contd.)



Each report could provide investors and entrepreneurs with up-to-date expert assessments and guidance



EMOTION AI: TECHNOLOGY REPORT

- 1: Measuring Emotions ^
How strong is the evidence?
 - Facial Expressions
 - Body Language
 - Voice
 - Biosensing ... [More]
- 2: Predicting Behaviors ^
How well do current models work?
 - Purchasing & Ads
 - Voting & Elections
 - Suicide
 - Lie Detection
 - Job Performance... [More]
- 3: Sensors & Devices ▾
- 4: Stakeholders & Concerns ▾
- 5: Checklist & DDQ ▾



SURVEILLANCE: ESG TOPICS REPORT

- 1: Types of Surveillance ▾
- 2: Legal and Regulatory Issues ▾
- 3: Surveillance Use Cases ^
What special considerations are there?
 - Defense & Counterterrorism
 - Police & Law Enforcement
 - Children & Schools
 - Public Health & Pandemics
 - Consumer Advertising
 - Workplace... [More]
- 4: Stakeholders & Concerns ^
What concerns do stakeholders have?
 - Freedom of Expression
 - Minorities & Vulnerable Groups
 - Democracy... [More]
- 5: Checklist & DDQ ▾



MENTAL HEALTH: INDUSTRY REPORT

- 1: Mental Health & Well-Being ▾
- 2: Managing Mental Health Care ^
What solutions are needed?
 - Diagnostics
 - Suicide Prevention
 - Substance Abuse Relapse Prevention
 - Telehealth Platforms... [More]
- 3: Legal and Regulatory Issues ▾
- 4: Stakeholders & Concerns ^
What concerns do stakeholders have?
 - Data Security & Privacy
 - Algorithmic Explainability
 - Consent
 - Autonomy
 - Clinician Job Quality & Security... [More]
- 5: Checklist & DDQ ▾

Tool 2 ESG RATING SCORES

ESG ratings agencies could provide independent scoring of material issues



Category	Dimensions (sub-scores)
Technology	Technological Readiness <i>Does this product work as claimed?</i> Intellectual Property Status <i>Does this product have defensible intellectual property?</i>
Stakeholders	Legal & Regulatory Status <i>Will this product likely face legal or regulatory challenges?</i> Stakeholder Support <i>Do key stakeholders support this product?</i> Human Rights <i>Does this product respect human rights?</i> <i>Analysts could also provide ratings for 2-5 issues most material to each industry such as:</i> AI Integrity <i>Does this product follow ethical AI principles?</i> Data Privacy & Security <i>Does this product adequately secure data & respect privacy?</i> Others: _____
Governance	Board Structure & Voting Rights <i>Does the board have sufficient independence to perform its oversight duties?</i> Board Diversity & Expertise <i>Does the board sufficiently represent the diversity of stakeholders and have the expertise to oversee material issues?</i> Corporate Policies & Procedures <i>Does this company have sufficient policies and procedures in place to prevent mismanagement?</i>



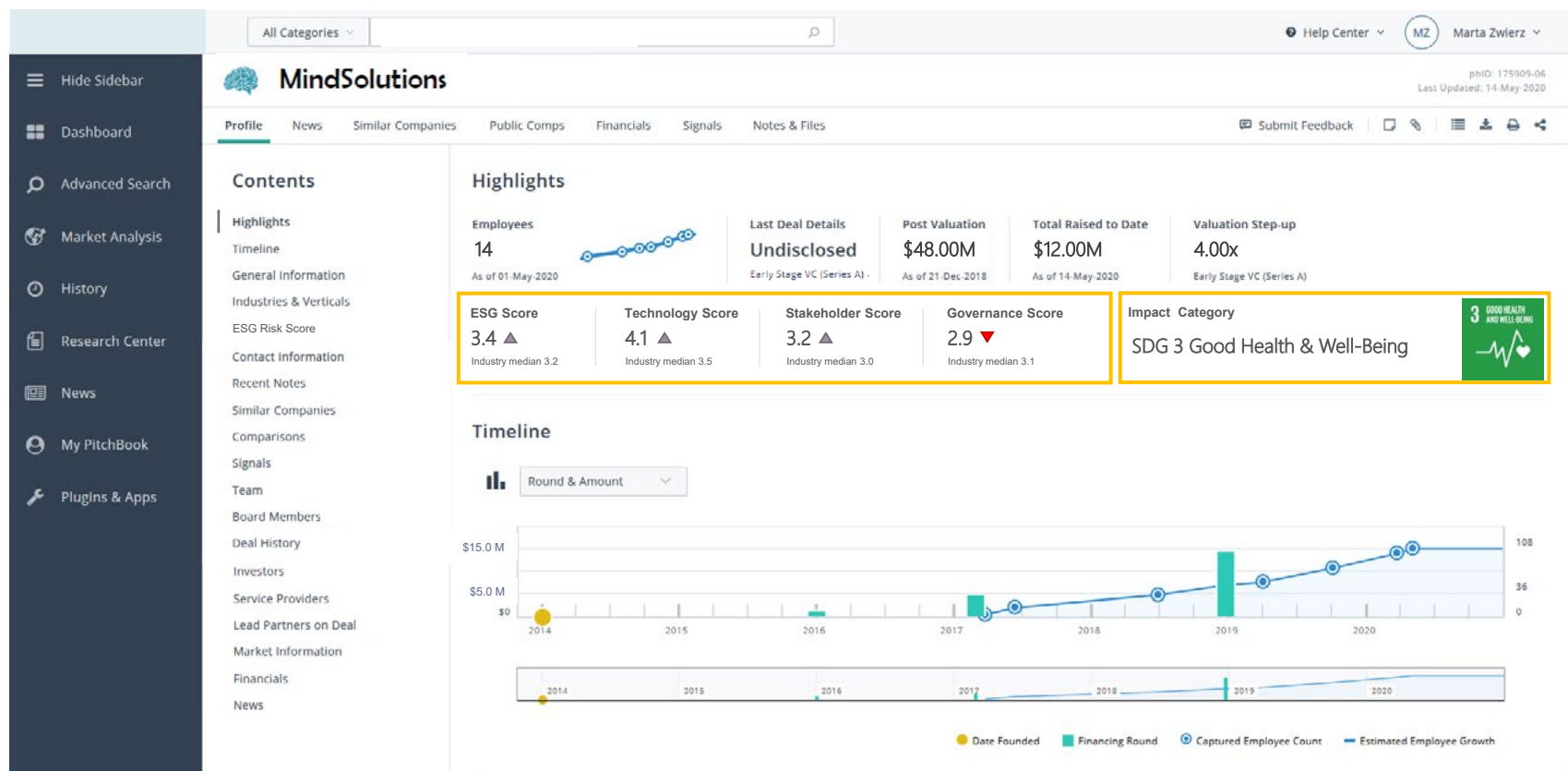
Stakeholder Support: Scoring Guide

Score	Description	Definition	Example
5	Strong Support	Near universal stakeholder support	AI for drug discovery
4	Support	Likely to have key stakeholder support, opposition limited to management of material issues (labor rights, privacy, affordability, etc.) but not product as a whole	Autonomous vehicle ride sharing service
3	Mixed Support & Opposition	Likely to face a mix of support and opposition	Reproductive gene editing service
2	Opposition	Likely to face significant opposition	Facial Recognition service for protests & crowd control
1	Strong Opposition	Likely to face extensive jurisdictional or international bans	AI-enabled direct-to-consumer weapons

Company	Stakeholder Support Score	What analysts say...
Mind Solutions	3.5	Preliminary results from pilot test show product has potential to reduce cost and improve efficacy significantly. Extensive media campaigns have been launched recently against similar companies over concerns of compulsory use, continual surveillance monitoring and unclear third-party data sales. Company states it is in process of developing privacy and data resale policy in consultation with stakeholder groups.

Tool 3 INTEROPERABLE DATA

ESG ratings could be integrated with market and financial data in existing industry databases = New content that could be added



Tool 3 INTEGRATED DATABASES (contd.)



GP Panel could highlight portfolio companies' ESG performance and flags high risk issues for attention

All Categories

Help Center MZ Marta Zwierz

Hide Sidebar

Dashboard

Advanced Search

Market Analysis

History

Research Center

News

My PitchBook

Plugins & Apps

Cambridge Park Ventures

Follow

Submit Feedback

Contents

General Information

Contact Information

Recent Notes

Fund Team (1)

Limited Partners (4)

Fund Investments (10)

Investment Preferences

Fund Investments (10)

Active Investments (8) Former Investments (2)

Company Name	Deal Type	Deal Size	Company Stage	Industry	ESG Score	SDG	High Risk Issues (Score<3)
Nube Cloud Sharing	Later Stage VC (Series C)	\$45.65M	Generating Revenue	Business Productivity Software	4.1 ▲		
VR GameTech Co.	Later Stage VC (Series C)	\$50.00M	Generating Revenue	Entertainment Software	4.3 ▲		
Dating Match AI	Early Stage VC (Series B)	\$17.65M	Generating Revenue	Social/Platform Software	3.1 ▼		1 Data Security & Privacy ▼
Crowd Control AI	Early Stage VC (Series B)	\$13.44M	Generating Revenue	AI/Machine Vision	2.9 ▼	16	1 Human Rights ▼
MindSolutions	Early Stage VC (Series B)	\$4.00M	Generating Revenue	Other Health Care Technol...	3.4 ▲	3	1 Board Diversity ▼
Photo Art AI	Early Stage VC (Series B)	\$9.70M	Generating Revenue	AI/Machine Vision	3.8 ▲		
AgriDrone	Seed Stage	\$0.5 M	Startup	Autonomous Robotics/ Drones	N/A	2	
Brainy-Band Co.	Early Stage VC (Series B)	\$3.50 M	Generating Revenue	Neurotechnologies/Wearables	2.9 ▼	3	1 Product Safety ▲ DTC brain stimulation wearables have not been independently tested for safety. No training is provided to customers for safe use. 1 Technological Readiness ▼

PRI Signatory?

Diverse Fund Manager?

Diverse Founders?

ESG Score

SDG

High Risk Issues (Score<3)

Investments by Industry

Investments by Deal Type

Tool 3 INTEGRATED DATABASES (contd.)

Analysts could provide detailed assessments on ESG performance relative to similar companies



Hide Sidebar

Dashboard

Advanced Search

Emerging Spaces

History

Saved Searches

Saved Lists

Notes & Files

Research Center

News

Plugins & Apps

Contents

Highlights

Timeline

General Information

Industry/Vertical

ESG

Contact Information

Recent Notes

Similar Companies

Comparisons

Signals

Team (14)

Board Members (10)

Deal History (3)

3. Series B 2018 Completed

2. Series A 2017 Completed

1. Capitalization 2016 Completed

Investors (9)

Service Providers

Lead Partners on Deals (7)

Market Information

Financials

All Categories

Search

Help

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SDG Alignment

SDG 3.4 By 2030, reduce by one-third pre-mature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing ...[More]

3

GOOD HEALTH AND WELL-BEING

Analyst Notes

Mind Solutions has three impact areas for advancing mental health and well-being.

1. Reduce mortality from suicide by ...[More]

Industry/Vertical

Primary Industry

Other Industries

Verticals

Other Healthcare Technology Syste...

Other Healthcare Services Clinics/Outpatient Services

Artificial Intelligence & Machine Le... Digital Health HealthTech Mobile

ESG Score

Overall score

Technology Score

Stakeholder Score

Governance Score

3.4 ▲

4.1 ▲

3.2 ▲

2.9 ▼

Industry Median: 3.2

Industry Median: 3.5

Industry Median: 3.0

Industry Median: 3.1

Factor

Score

Analysis

Analyst Notes

Technology Score

4.1 ▲

4.0 Technological Readiness: The base machine listening technique can reasonably ascertain factors like amplitude, speech rate, onset of speech...[More]

Company plans to publish details on its suicide risk detection system in peer reviewed journal in next year ...[More]

Stakeholder Score

3.2 ▲

3.0 AI Integrity: While company has released statements indicating that it tests for bias and works to de-bias its results, sufficient data is not available to ensure that this de-biasing is above and beyond what is managed in published R&D. ...[More]

Company states will hire independent review of algorithm bias and integrity.

3.0 Data Security & Privacy : The company has not published ...[More]

Company states will develop and publicly release data privacy and data sharing policy...[More]

Governance Score

2.9 ▼

2.0 Board Diversity: Company currently has 0% female board members.

Company states that plans are being implemented to achieve 40% female representation on board by 2022. Company plans to establish patient and clinician advisory council for...[More]

2.5 Independent Expertise: Board lacks independent representation of scientists and behavioral health experts...[More]

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59



Technology and Public Purpose Project

Belfer Center for Science and International Affairs
Harvard Kennedy School
79 JFK Street
Cambridge, MA 02138

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