

EXECUTIVE SUMMARY

SiMi (STARTUP INVESTMENT MODEL INDEX)
**Methodology & Baseline
Data Model Peer Review**

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Abstract

Vcs disproportionately fund male-led startups. This is especially problematic in early stage startups. SiMi™ (Startup Investment Model Index) analyses the maturity of early-stage startups based on the merits of the startup. To test SiMi, we used a dataset of 752 startups that received their initial round of funding.

The results of the analysis revealed the fundamental funding problem and a SiMi-based solution.

SiMi™ showed a correlation between its score and the round/amount of funding. It further demonstrated that funded companies had statistically similar scores, regardless of founder.

The data analysis, showed, however, that female-founded startups are simply locked out of certain industries, likely never getting evaluated.

SiMi™ can help these female founders by giving them an assessment of their startups, where to improve, and where best to seek funding.

Only by giving diverse founders a greater opportunity to be funded, can we solve the diversity problem. SiMi™ can deliver that opportunity.

Background

VC funding is disproportionately distributed to companies with single male founders. F4 Capital's Startup Investment Model Index (SiMi) was created to help founders get their initial round of funding. F4 enlisted a Data Analyst from Northeastern University to analyze patterns from the SiMi baseline data model that will be utilized to develop the production version of SiMi.

About F4

Female Founders Faster Forward (F4) represents under-served founders being systematically shut-out of venture capital funding—not because of their startup investment viability, but because of their gender, race and social economic background. F4Capital was founded to change the archaic venture-investment model and to deliver more venture capital to female founders. F4 is developing SiMi™ (Investment Model Index) that measures startup maturity, opportunity, and risk, while eliminating bias and prejudice in prevailing venture-funding processes. F4 operates as a non-profit 501c/3 organization.

(www.f4capital.org)

Introduction

The diversity in Venture Capital investing continues to worsen, and the trends promise even worse results in the future. First, new players will play a bigger role in early-stage funding. This will make it more difficult for new founders to find sources of funding. Second, since very few existing startups have diverse founders, there is little for new founders to emulate.

Newer groups are taking the role of funding early-stage startups. In 2017, VCs invested \$85 billion — more than ever. Since peaking in 2014, however, the number of deals has declined every year. They are putting bigger bets on a smaller number of later-stage startups. To fill the void, angel investors, accelerators, and early-stage investment firms are funding the early-stage startups.

First-time founders will have a more difficult time finding initial funding. Since they lack the connections into the community, they will not be able to find all the sources of funding. Furthermore, new investors are likely to “play it safe” and emulate the models of the larger VCs. Unfortunately, in 2017, female-founded startups only received \$1.9 billion, or 2.2%, of funding.

The challenge is structural, not tied to one set of investors. Traditional VCs invested in 368 female-founded startups and 5588 all-male teams (about 6%). The Top 10 Female-led VC firms invested in 142 startups in 2017, 15 female-founded startups vs. 29 mixed team founded startups vs. 98 all-male founded startups. The average deal for a female founded startup was \$10.2M, the average deal size for mixed team founded startups was \$17.5M and the average deal for all-male founded startups was \$34.7M. Female-led VCs invest with the same general approach as their traditional counterparts.

Diverse, new founders struggle to find guides to help them through the process. The lack of diverse founders creates a vicious cycle in which we will continue to lack diversity in founders.

Venture Capital firms struggle to assess the maturity of the early-stage startups in which they invest. In the absence of the metrics that are associated with later-stage startups and public companies, firms tend to resort to “gut feel” or “following a pattern”. Thus, VCs invest in the same kinds of startups with the same types of founders. Conversely, early-stage startups struggle to find the newer funding groups, understand what matters to the VCs, how to compare themselves to their peers, and where they need to improve to achieve the level of funding they desire.

SiMi™ (Startup Investment Model Index) is being developed by F4 to provide a better approach to evaluating the maturity of early-stage startups.

SiMi Baseline Data Model

The Dataset

The dataset is comprised of 752 startups founded after 2008, with headquarters based in Canada and the United States that successfully secured their first funding round.

Dataset Included

- Startups founded after 2008
- Startup that successfully secured \$2,000,000 or more during their first funding round.
- The funding round types included are Angel, Seed, Series A, Series B, and Series C.

Dataset Excluded

- Startups founded before 2008
- Startup secured less than \$2,000,000 during their first funding round.
- The funding round types excluded are Grants, IPO, Debt, Convertible Note, and Initial Coin Offering (ICO).

Data Input From

342

Founders & Investors

356

Founders Only

54

Investors Only

Data Fields Include

Startup ID
Investor ID
Company Headquarters
Number of Founders
Gender of the Founders
Funding Round Type
Funding Round Amount
Industry Segment
Segment Categories

SiMi Methodology

The Startup Investment Model Index (SiMi) analyzes input from startup founders and/or investors to then assess the maturity of the startup.

Each startup founder and/or potential investor assessed the startup on the eight categories.



SiMi Score Calculation

Investors and Founders score the startup based on eight criteria - each from a scale of 0-100. Therefore, the maximum points that a startup can receive from either party is 800. The startup is placed within a 5-stage maturity model based on the inputs from the investors and founders. The maturity stages are:

Since certain criteria have more weight based on the maturity stage, SiMi runs a second stage of calculation. This final calculation creates the startup's SiMi Score by weighting the appropriate categories more heavily.

Maturity Stages



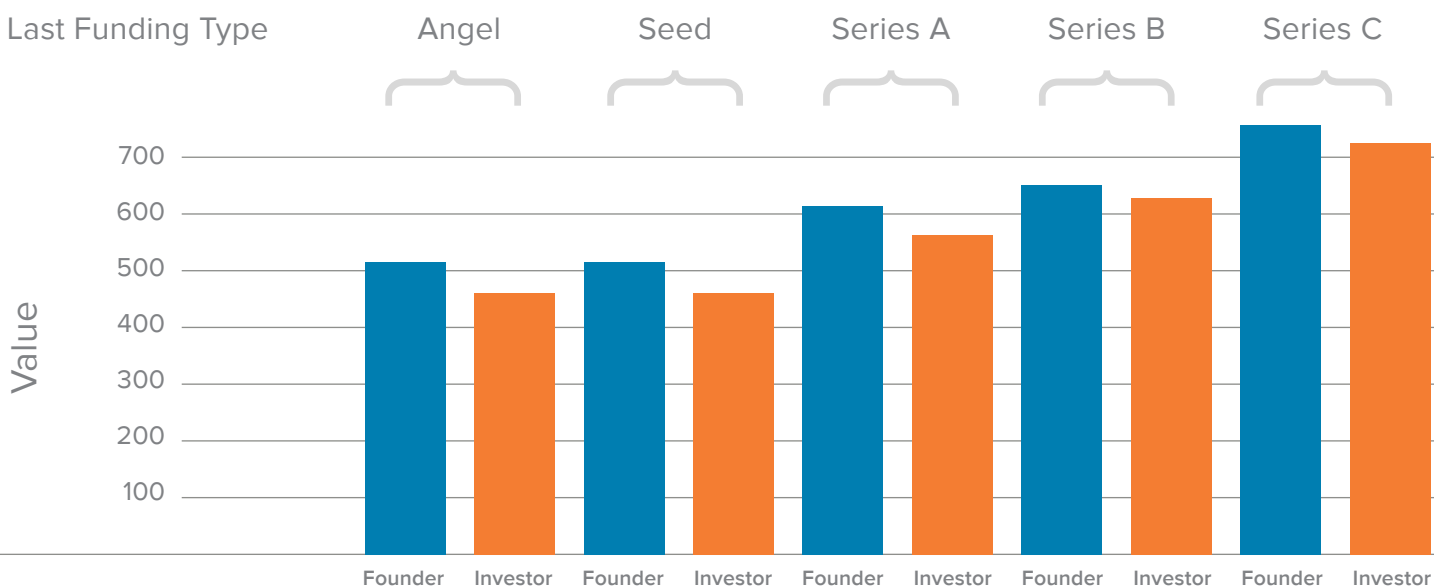
SiMi Methodology Assessment

The Startup Investment Model Index (SiMi) analyzes input from startup founders and/or investors to then assess the maturity of the startup.

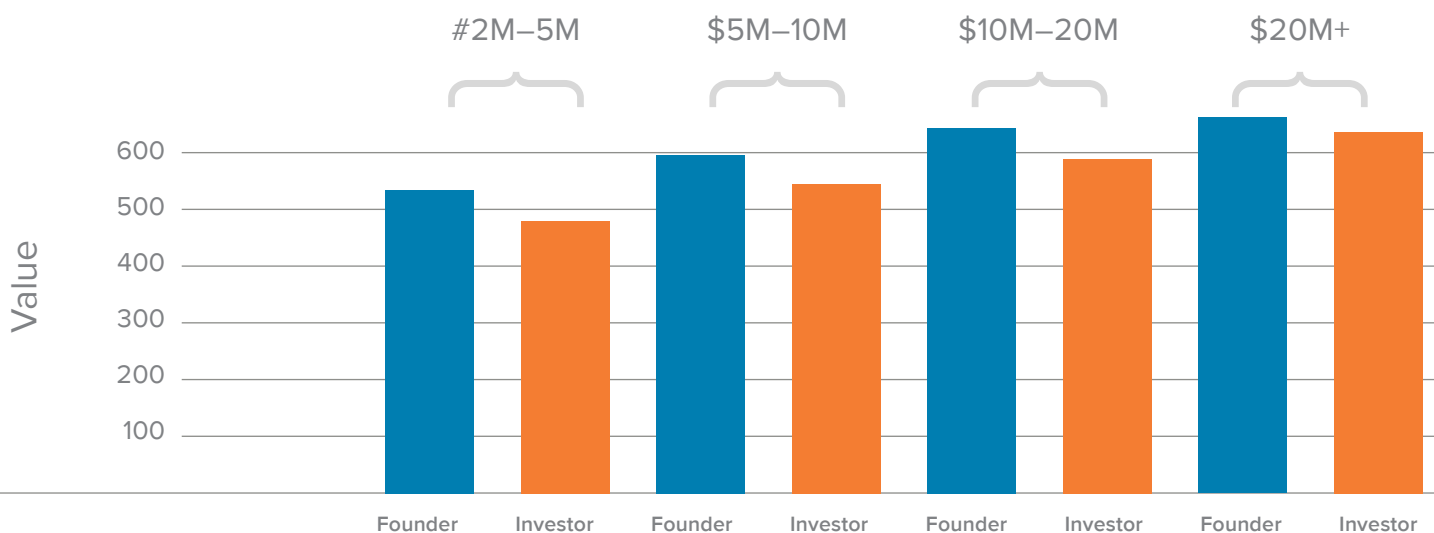
The results show that SiMi accurately assesses the maturity of early-stage startups.

Across all funding rounds and dollar figures, founders graded their startups with a higher score than their investor counterpart, but the SiMi score matches with the funding round.

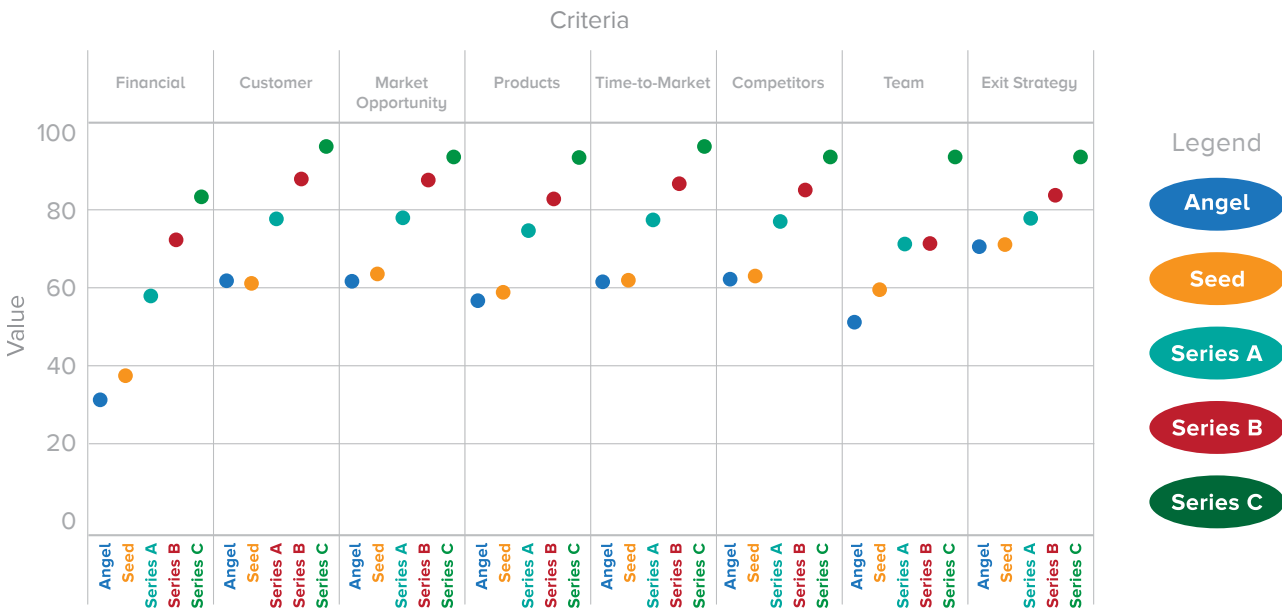
Founder vs Investor by Funding Type



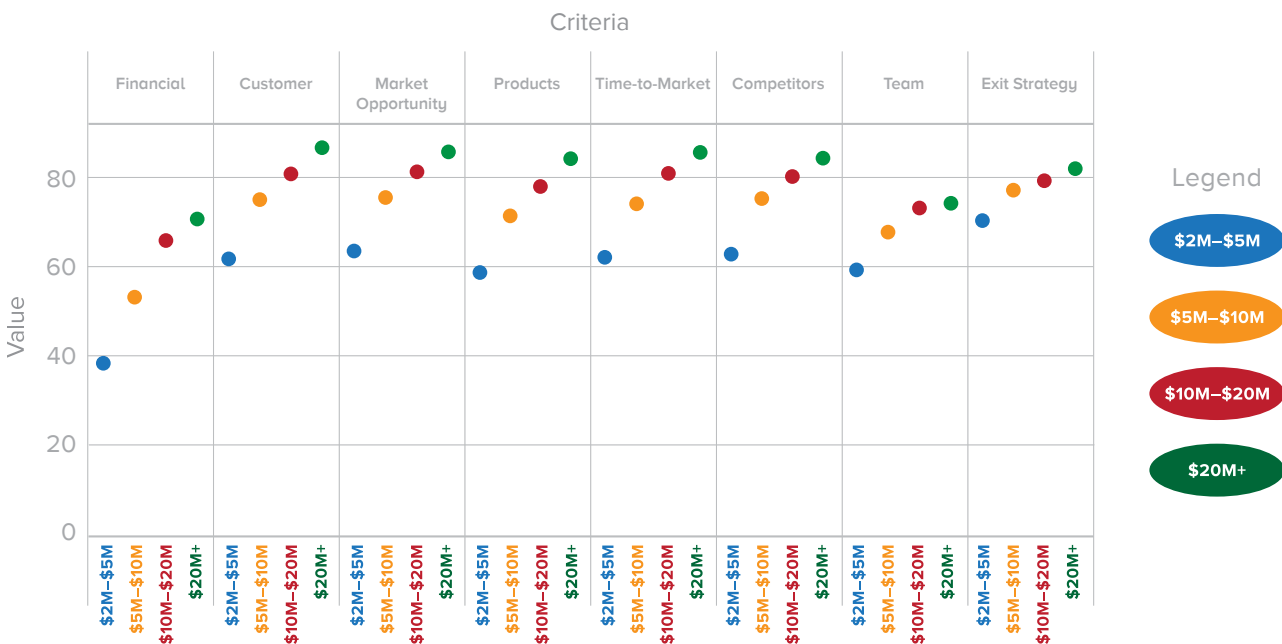
By Funding Amount



Average Criteria Score vs Fund Round



Average Criteria Score vs Fund Amounts



Once again, SiMi scores tie in with the funding round/amount. Moreover, it reveals which factors are more strongly correlated to funding than others. For example, “Team” shows little correlation to the amount of funding. While VCs often tout the value of “Team”, the results show that they do not change their score for the team over the course of most of the funding rounds. This is consistent with the VCs evaluating just the founders.

This leads to even greater challenges for diverse founders – they simply don’t fit the VC mold.

Conversely, the other categories show an almost linear relationship between round/amount of funding and their evaluation.

Dataset Analysis

Gender

We analyzed the dataset by gender. Almost 88% of companies were founded by males. That is the “Team” that VCs are looking for.

Total Funding Stage vs Total Funding Count

	Female	Male	Mixed	Grand Total
Angel	5	57	6	68
Seed	16	280	23	319
Series A	11	280	27	318
Series B		42	4	46
Series C		1		1
Grand Total	32	660	60	752

Total Percentage

	Female	Male	Mixed	Grand Total
Angel	0.66%	7.58%	0.80%	9.04%
Seed	2.13%	37.23%	3.06%	42.42%
Series A	1.46%	37.23%	3.59%	42.29%
Series B		5.59%	0.53%	6.12%
Series C		0.13%		0.13%
Grand Total	4.26%	87.77%	7.98%	100.00%

Percentage of Gender vs Funding Stage

	Female	Male	Mixed	Grand Total
Angel	7.35%	83.82%	8.82%	100.00%
Seed	5.02%	87.77%	7.21%	100.00%
Series A	3.46%	88.05%	8.49%	100.00%
Series B		91.30%	8.70%	100.00%
Series C		100.00%		100.00%

Key Takeaways

- Female founded startups has the lowest count at 32.
- Male founded startup dominate as they represent 87% of the dataset.
- Startups received funding in the Seed and Series A rounds as they each represent a combined 85% of the data set. (42.49% / 42.29% respectively).

Dataset Normalization

We want SiMi to be a tool that can be used by founders, investors, or both. Founders may want to use the tool to evaluate their company, as a measure to present to investors, or as a mechanism to find potential investors. Investors may want to use it to ensure that they are not falling victim to their own biases and assumptions.

Therefore, we wanted to understand the delta between the inputs of founders vs. investors, so that we could normalize the results.

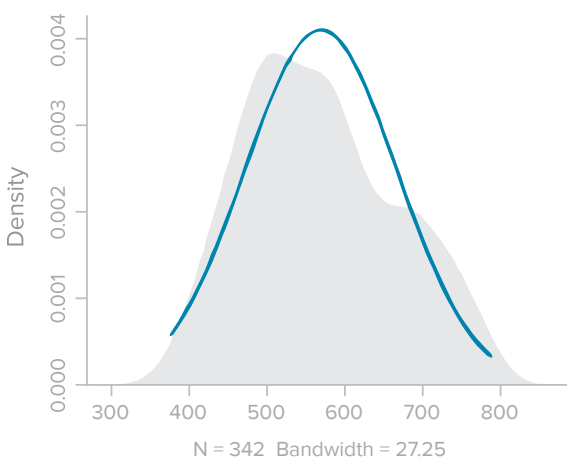
Since founders and investors graded the startups differently, we needed to apply a standard modifier to standardize the results. The modifier is calculated based on the inputs from the startups with scores from both parties. The dataset has 342 startups that have inputs from both parties to help create that modifier. We calculated the modifier by calculating the founder-only average and investor-only average. We then calculated the overall average. The founder-only modifier is: $\text{average} / \text{founder-average}$. The investor-only modifier is: $\text{average} / \text{founder-average}$.

Since the standard modifier and average scores are calculated based on the 342 startups with both inputs we need to test if the variance between the two inputs is significant.

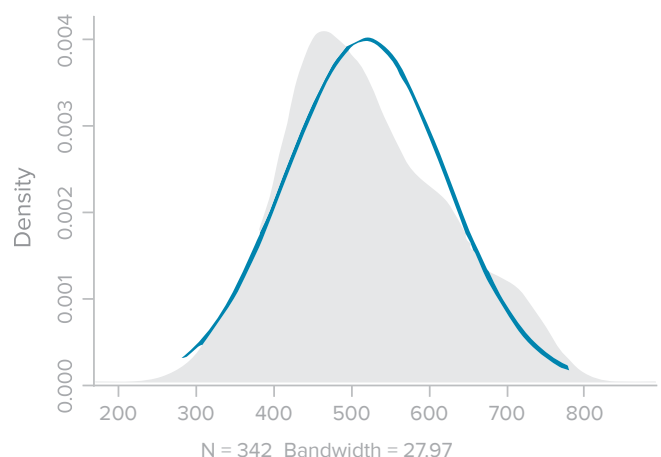
The statistical test that was employed to test the variance is called the “F-test”. The F-Test operates under the assumption that the underlying data that is being tested follows a normal distribution. The below density plots were generated to test the founder and investor score distribution.

The below density plots show that the investor and founder scores do not follow a normal distribution, so the statistical power of the F test will decrease if we do not normalize the data. The data was transformed utilizing the box cox method. This method passes all the data points through an equation that calculates the optimal value of each data point to create a normal distribution curve.

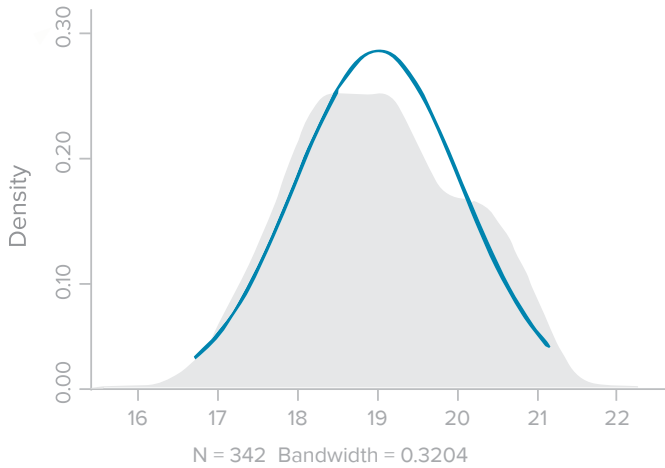
Founder’s Score Distribution



Investor’s Score Distribution

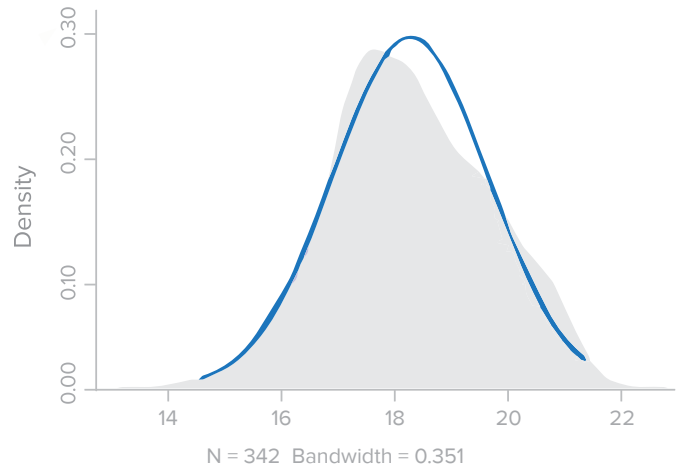


Boxcox Founder



The below charts show the distribution after the box cox transformation, the data follows the normal distribution curve and the F test was successfully utilized to test the variance. The variance between the investor scores and the founder scores is not significant so the average between the two inputs can be used and the standard modifier can be calculated based on the 342 startups that received inputs from both parties.

Boxcox Investor



Thus, we can apply a standard modifier to the SiMi score and get accurate assessments if only one of the founder/investor participates.

Acknowledgements

We would like to acknowledge Northeastern's Level Program in collaboration with The Experiential Network for their contribution to validate the SiMi methodology and analyse the baseline data model dataset.

Level Education programs include data analytics, Internet of Things, and entrepreneurship. Level's collaboration with Northeastern's Experiential Network enables Level students to engage in Capstone Projects with industry sponsors like F4.

The Experiential Network (XN) is a new initiative built to ensure experiential learning opportunities for graduate and professional studies students and to further enhance Northeastern's position as the global leader in experiential learning for all students.

Partnering with sponsoring businesses and organizations, XN facilitates opportunities for students to work on short-term, real-world projects to complement their academic work. Projects are carried out virtually over a six-week period, and students and sponsors work closely in an authentic professional environment during which students produce deliverables for their sponsors that will go on to inform critical business decisions.

Participation in XN projects allows students to apply classroom theory to practice and grow their professional networks while contributing to a real-world organization's ability to move forward on project-based work and connect with rising professional talent.

Summary

After reviewing the dataset comprising 752 startups that successfully achieved their 1st round of funding, the SiMi™ Score has proven to provide an objective assessment. The SiMi™ Methodology is built upon eight critical categories that measures different aspects of the startup. SiMi™ assesses early-stage startups to level the playing field from the beginning. VCs struggle to evaluate early-stage startups because traditional metrics do not yet apply. SiMi's methodology is tuned for early-stage startups. It begins with an evaluation from founder and/or investor of the eight core aspects of an early-stage startup. SiMi uses the initial feedback to identify the maturity stage of the startup. At each maturity stage, different aspects become more important. Therefore, SiMi creates a weighted score based on the importance of the aspects of the startup at its maturity stage. SiMi then recommends the best fits for startups and investors. SiMi's multi-stage algorithm bring clarity to early-stage investing for founders and investors alike. The SiMi™ Score should help address the challenges of diverse founders not getting an opportunity to even have their startups be evaluated by VCs.

SiMi™ delivers an objective assessment of a startup, so that founders and investors can make better informed decisions.