

A Unified Government-VC Approach to Crossing the Valleys of Death

By Orin Hoffman *Venture Partner, The Engine*
 orin@engine.xyz

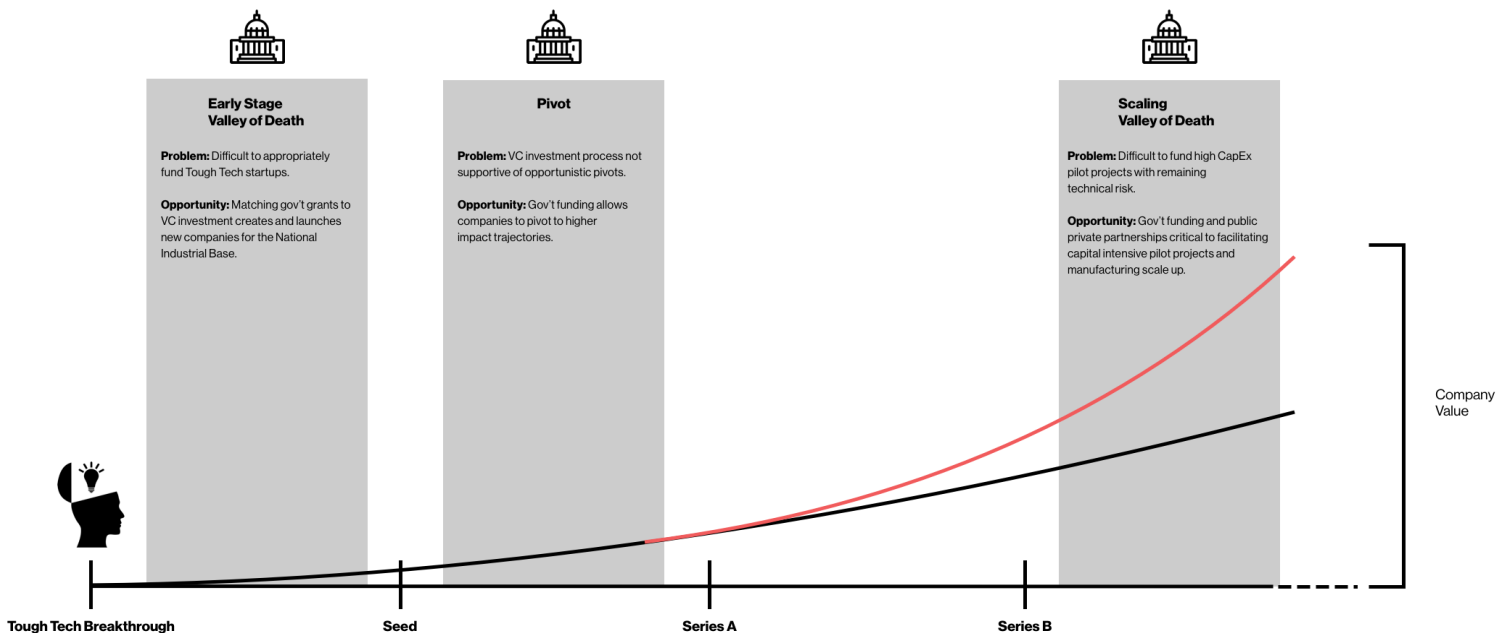
For Tough Tech startups, the valleys of death are wide, and, to successfully scale dual-use companies that will bolster the US National Industrial Base, coordination of government funding and private investment must become better understood, timed, and executed.

Currently, most government non-dilutive allocation programs are not aligned with the typical timelines or focus areas of companies that require VC investment to commercially scale, and the VC community is also constrained by fixed market process, risk tolerance, and capital limitations. While VC investment is not a panacea, in the current competitive global market it has become increasingly impractical to attempt to bootstrap capital intensive dual-use companies. Creating programs to better leverage both VC and government dollars to invest in spurring the National Industrial Base is increasingly critical for US global competitiveness.

Typically, private investment (VC, angel, other) provides the flexible funding required during critical phases of growth. This funding is generally provided in a series of fixed rounds. Correctly applied, government funding has the potential to provide non-dilutive runway and increased business optionality during times of high technical risk that often exist between these rounds.

The graphic below overlays a typical private VC investment timeline with three optimal junctures of desired government investment, each phase having unique requirements to be effective.

- In the early **Pre-Seed** stage, matching government funds to VC investment spurs more diverse investment and allows companies to focus on commercial growth and company formation.
- In the **Pivot** stage, speed of execution of government funds is critical. This allows companies to successfully pivot or scale the product within the timeline established by private investors.
- In the **Scaling** stage, flexibility of government support, whether through matching grants, government backed debt, or public-private partnerships, can offset some of the remaining technical risks in the creation of the creative financial vehicles required for these large CapEx projects.



Early Stage Valley of Death

The survival of a Tough Tech company in its earliest stages — that precarious time between the initial idea or technological breakthrough and product development — is dependent on a founding team obsessively focused on growth. Simply obtaining funding at this stage is challenging, which is why non-programmatic (preferably VC-matching) government funding is so critical — it has the power to catalyze private investment.

This funding must allow a founding team the ability to flexibly and simultaneously pursue technical risk reduction, customer discovery, marketing, hiring, space creation, amongst other activities, rather than focusing on a narrow statement of government-specific work. In this phase, it is the critical National Industrial Base area in which the company is working that is contingent to matching VC-government investment rather than any specific, government-focused deliverables. Using both the VC community and these National Industrial Base areas as the filter, the government will be able to increase the number of viable early stage companies while also massively decreasing the overhead on these early stage companies to receive this funding.

Tough Tech company attributes

- New team without past performance
- Significant engineering risk
- Commercialization plan still fluid

Ideal government support

- I-Corps or Activate-like programs focused on commercial market discovery with low overhead barriers to entry
- Matching government funds to private investment (ideally more than a 30% match to ensure private investors keep sufficient skin in the game)

Current issues with government support

- Focus on government statement of work misaligns or distracts from viable commercial or dual-use development
- High overhead to find and apply to the myriad of available government grants in a timely manner. Biases funding towards companies already “in the game.”
- Insufficient government funds cannot create a viable company within a single program, creating an unintended consequence of continuing to need to apply for government funding to maintain staff and runway
- Decreases chance for VC investment if government funding is distracting

The Pivot

Seed investment enables early-stage companies to explore the commercial viability of their core technology with greater rigor, often uncovering new product possibilities and business models. Tough Tech startups should not feel constrained by the limitations of seed investors if they uncover a new approach that could lead to more significant global impacts and company growth.

Funding between rounds for a pivot is challenging and rare, especially if that pivot occurs late in the funding round (e.g. 8 months into an 18 month sprint). The government funding at this point could allow companies to dramatically expand their growth and impact, which, in turn, will fundamentally strengthen the National Industrial Base. However, to be at all effective in this phase, this funding must be allocated quickly.

Tough Tech company attributes

- Significant customer discovery completed
- Fluid product roadmap based on customer feedback and technical exploration
- Laser focus on achieving minimum viable milestones to prove customer-product traction and attract the next phase of private investment.
- Potential discovery that changes product or business model not supported by current investment

Ideal government support

- Rapid allocation of funds to support a more impactful dual-use product or business roadmap
- Funding targets companies that can pivot into critical National Industrial Base areas
- In order to move more quickly, government would support the Pivot using the same contract vehicles as those used in pre-seed matching VC-government grants

Current issues with government support

- The inability to rapidly allocate funds during a pivot opportunity is the single biggest limiting factor of government support at this stage

Scaling Valley of Death

Scaling Tough Tech is complex and capital intensive. Even pilot projects can be physically massive and technically elaborate (think: baseload power plant, fusion reactor, an industrial-scale filter system, etc...). These projects demand careful negotiation with partners, government, and capital to fabricate, install, and operate.

This type of scaling is difficult for traditional VCs to accommodate, and there is often too much risk for traditional project finance.

Government can play a significant role at this stage by augmenting funding with a mix of matching grants, loan guarantees, insurance backstops, and public-private partnerships, in addition to clarifying and helping clear regulatory hurdles. DOE LPO projects have proven the effectiveness of this concept. Exactly who would manage this proposed program remains an open question.

Tough Tech company attributes

- Difficult for VCs to provide funding to companies for CapEx-intensive pilot projects
- Too much risk for traditional project finance; such financing typically requires revenue
- Often insufficient assets for asset finance

Ideal government support

Note: solutions to the Scaling Valley of Death are the least understood, in part due to the high capital expenditures required for even government pilot programs. Even pilot experiments will likely take significant congressional and senior agency leader support.

- Government led Tough Tech certification programs that provide insurance backstops. As an example, NASA's launch certification program
- Lower application cost guaranteed loans in the mid-range CapEx (\$10-\$200M) across a wider range of Tough Tech areas
- Public-private partnerships
- Matching private investment grants (up to 50%)

Current issues with government support

- Loans backed by federally guaranteed loan programs are generally extremely large and require significant capital and overhead to apply (loans generally are in the billions of dollars and are directed towards lower risk commercial scaling)
- The valleys of death from pilot to "commercially feasible" are not impacted by these loan programs for most Tough Tech companies
- Limited technical scope of federally guaranteed loan program guarantees

Conclusion

Early-stage Tough Tech companies benefit from the flexibility of the VC model to secure initial growth funding. But as these companies begin to grow, so too do the demands — on the part of the company and the investors — to justify subsequent funding. These demands often limit the flexibility of VC investors, even if the company in which they invested could pivot to a position with greater impact on the National Industrial Base.

Government funding can add flexibility back into the equation, especially at the critical inflection points described above. But this funding must have a wide scope and be deployed quickly, two characteristics not traditionally associated with such funding.

There are a number of programs emerging, such as the ARPA-E SCALEUP program and the US Air Force AFWERX matching and accelerated SBIRs, that begin to address the challenges noted here. These initiatives are a start. The US National Industrial Base, however, has needs outside of DOE and US Air Force-related problem areas. And no government agency is adequately addressing the early stage investment valley of death.

One thing is clear: the US Government has the power at every stage described above to create financial and regulatory incentives that can support critically underserved Tough Tech National Industrial Base companies by leveraging the vast resources of the private capital markets.

Centralized global competitors such as China have engineered an incredibly powerful and integrated support system for their respective Tough Tech ecosystem. In the US, the entities responsible for establishing creative funding lines, contract vehicles, and regulatory support to provide the flexibility noted above remain an open question. It is a question of exceptionally high stakes — one that we, in our collective interest in US global competitiveness, must address.