

# Linked but desynched

## An OODA analysis of associated entrepreneurship accelerator programs

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# Abstract

*Accelerators* support fledgling ventures with a set curriculum, moving them through a cycle of venture development, culminating in a Demo Day pitch in which the ventures argue for their viability. Yet firms are often involved in multiple programs with conflicting objectives and cycles. No research has addressed such conflicts.

In this article, we examine an accelerator program partially linked to others to share resources. Drawing on the OODA framework, we identify disjunctures among cycles, anchoring this analysis at the final pitch. Working back from this Decide point, we examine interference among the associated programs.

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# Introduction

At the end of Summer 2018, we spoke to the director of SEAL, a seven-week summer accelerator program meant to help students or recent graduates decide whether to launch ventures based on their technologies (known as a “Go/No Go” decision; Spinuzzi et al. 2020). He had graciously allowed us to observe these teams’s pitches and interview them. Now that the program was over, we asked him to reflect on a big change that had been made to this annual program. In previous years (2008-2016), the program was exclusive to students and recent graduates at one university. In 2017, it was opened to students at other universities as well as faculty members. But in 2018, the year under analysis in this paper, it was shortened to from eight to seven weeks and also became part of training for the parent institution’s National Science Foundation I-CORPS Go regional program—a program that involves teams that are unaffiliated with a university or based on intellectual property that a university did not own, teams that also planned to write Small Business Innovation Research (SBIR) proposals to fund their technology development. In addition, one additional team came from the Austin Technology Incubator (ATI). In total, 11 of the 21 teams participating in the 2018 SEAL were from I-CORPS Go<sup>1</sup> rather than student teams, and one team was from ATI; whereas the program had previously been specific to student teams, student teams were now outnumbered with only 9 teams. “In some ways, an entrepreneur is an entrepreneur, especially at the early stages, but it’s a different feel when you have—*yeah.*”

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<sup>1</sup> The program was named I-CORPS Go in part because it was meant to facilitate a go/no go decision: Should the entrepreneur pursue this business or not?

The “*yeah*” at the end of this quote reflected the confusing nature of this year’s program. It wasn’t just that some of the teams were in I-CORPS Go; it was that this complexity was added on top of the other programs in which most of the teams (both student and non-student) had been involved, programs that sometimes happened at the same time as other mentoring and customer acquisition—something that would usually happen after a Go decision (cf. Spinuzzi et al. 2018). In such cases, different accelerator, incubator, and entrepreneurship training programs had become linked, but also *desynched*: out of synchronization, interfering with each other.

Why were they desynched? As the program’s director for ecosystem development stated, entrepreneurs were like runners training for a marathon and who always sought to join a running group to help them with their training (Director 2). But like running groups and programs, entrepreneurship programs tend to achieve different objectives, emphasize different decisions, and follow different cycles and speeds, “peaking” at different times. This fact is illustrated by quote from one of the I-CORPS Go firms:

These things happen in such an integrated manner and they're iterative. They're happening over and over again, and they're happening all together. I-CORPS, specifically, has some things that work really well and need to be thought about on an ongoing basis. They're not the same things that we're seeing here. There's some other emphases that are happening here that don't work against those. Those two or three things happening together at the same time as the real business pressure of making money now, getting money to flow now, that kind of a pressure is going on. (Firm 6)

Firm 6 had just come out of the regional I-CORPS Go program, was undergoing SEAL, and was preparing for the national I-CORPS program, but was also located within a university’s research

collaborative and involved with that university's accelerator. For Firm 6, and for most other teams in SEAL, things were "happening over and over again, and they're happening all together": they had to observe multiple aspects of their business (e.g., market segment, technological solution, business model), orient to multiple problems, decide on different things, and act on those decisions, while retaining enough strategic coherence to remain viable as a firm. Indeed, even though most teams publicly declared a Go decision at the end of SEAL, they also asserted in interviews that they had either already made the decision before entering the program or that they could not yet make it due to I-CORPS obligations.

How do these interferences manifest in SEAL? To analyze this underanalyzed phenomenon of linked-yet-desynched entrepreneurship programs, we investigate a mix of 11 SEAL teams (both students and non-students) using a framework that was specifically developed to conceptualize such situations, a framework that has itself deeply influenced entrepreneurship training: OODA (Observe, Orient, Decide, Act; see Osinga 2007). Finally, we conclude by discussing OODA's strengths for this sort of analysis, but also its weaknesses, and how those weaknesses could be addressed with complementary social theory.

## Literature Review

To better understand such entrepreneurship training programs, we first review the literature on pitching and venture development, then how it intersects with the OODA framework.

### Pitching and Venture Development

New ventures must develop both an offering (a product or service) aimed at market need and a business model that can sustainably deliver that offering. Furthermore, they must *pitch* their

offering and business model to stakeholders (potential investors, partners, suppliers, mentors, team members, and customers) whose support they need in order to start and sustain that venture. This work of pitching has historically been supported by a genre called the *business plan*. As Steve Blank argues in a *Harvard Business Review* piece, a business plan is “a static document that describes the size of an opportunity, the problem to be solved, and the solution that the new venture will provide”; it precedes the product on which the business is built, assuming that “it’s possible to figure out most of the unknowns of a business in advance, before you raise money and actually execute the idea.” He charges that a static business plan prevents the entrepreneur from collecting customer input from the market—until “the sales force attempts to sell it,” at which time “entrepreneurs learn the hard way that customers do not need or want most of the product’s features” (Blank 2013b, p.5).

The business plan, according to Blank and other Lean Startup devotees (e.g., Blank & Dorf 2012; Maurya 2012; Ries 2011), is too static, slow, and (most importantly) *insular* to deal with the rapidly changing landscape of business competition. It assumes isolation rather than interaction with the business environment. Thus it yields both a product and a business model (i.e., a way of sustaining the product through reliable income streams) that have not been sufficiently tested. Because of these drawbacks, Lean Startup advocates have advocated either replacing or preceding the business plan with more nimble descendant genres focused on continual *interaction*. These genres include the *pitch*, a live performance (backed by a slide deck) meant to offer the basics of the business argument and gather feedback during a question-and-answer (Q&A) session; a *Business Model Canvas*, a heuristic meant to display the business model with its many complex connections; and a *Minimum Viable Product*, essentially a functional prototype of the envisioned system. All three of these descendant genres are meant to

offer hypotheses, test them with rapid audience feedback, and iterate them to yield a compelling claim for value (i.e., value proposition), a functional business model, and a product that can realistically provide value for the audience. They replace isolation with interaction, encouraging entrepreneurs to “get out of the building” (Blank & Dorf 2012), interact with potential customers, and cocreate value with them. The Lean Startup inspires the approach for many entrepreneurship training programs (Mansoori et al. 2017), including the National Science Foundation’s I-CORPS Go program and SEAL. Indeed, Steve Blank was integral in creating the I-CORPS program for university innovators.

Such entrepreneurship training efforts include accelerators and incubators. As Cohen (2013, p.20) argues, these two types of efforts have different structures and purposes:

- *Accelerators* are defined as “A fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo-day” (Cohen & Hochberg 2014, p.4). They are short-term (between three days and three months), competitive, and cyclical, involving intense mentorship and seminar-style structured education; they address early-stage ventures, when the entrepreneur is still trying to figure out a business model and identify a customer segment. Accelerators are frequently structured as pitch competitions, with the entrepreneur competitively pitching their venture at the end of the program. Examples include SEAL, I-CORPS Go, and Cleantech Open. Additionally, some university programs function as accelerators, such as the University of Texas’ Longhorn Startup, the Texas Tech Accelerator, and Baylor University’s BRIC LAUNCH. SEAL has traditionally been a 9-11 week program, but in 2018, it was shortened to seven weeks.



- *Incubators*, in contrast, are medium-term (1 to 5 years), non-competitive, involving minimal or tactical mentorship and ad hoc education; they can address both early- and late-stage ventures. Incubators are meant to facilitate entrepreneurs' networks (Busch & Barkema 2020) and to help them learn to exploit specific intended markets (Soetanto & Jack 2016). The power of an incubator is its established presence in a community and the network of contacts it can confer on new firms to assist with market development, product perfection and funding access (Bøllingtoft & Ulhøi 2005). Examples include the Austin Technology Incubator (ATI) and Capital Factory.

Accelerators and incubators thus vary in their outcomes, lengths, cycles, and decisions—not just between the two groups but also within groups. For instance, Three-Day Startup teaches the rudiments of entrepreneurship through highly structured, hands-on activities, resulting in a pitch that likely does not represent a workable business. SEAL also teaches the rudiments of entrepreneurship, but structures longer conversations with mentors, resulting in a public decision: a “go/no-go” pitch in which the founders decide whether their proposed venture is workable. The I-CORPS Go regional lasts three weeks, focusing on the basics of Lean Startup and preparing ventures to perform 100 interviews of potential customers, interviews they must complete before they enter the seven-week I-CORPS Go national program.

Yet accelerators and incubators are interlinked. Sometimes this linking is ad hoc, as when a firm enters multiple accelerators and incubators. Sometimes it is formalized, as in the SEAL/I-CORPS Go linkage. This interlinking means that accelerators and incubators are often symbiotic. Incubators use accelerators to identify plausible medium-term ventures to enroll, as well as to offload specialized structured education for the ventures that have already enrolled. Additionally, young ventures often seek accelerators on their own: as the program' director for ecosystem

development, Director 2, told us: “With them it's just kind of like, ‘I need a program.’ You know people who want to sign up for a marathon, but I need to join a running group or a program.”

Consequently, ventures must follow the cycles of each program in which they are involved, absorbing different educational programming and mentorship and producing documents, reports, and especially pitches on different schedules for different audiences.

In the literature on pitching, this interlinking across programs has been lightly mentioned (e.g., Spinuzzi et al. 2018), but studies have mainly focused on pitching solely in the context of the incubator or pitch competition (see Sabaj et al. 2020 for a review; for examples, see Cabezas et al. 2020; Galbraith et al. 2016; Spinuzzi et al. 2018, Spinuzzi et al. 2016). The focus has been on examining a venture’s more or less linear journey from idea to incubation to exploitation (Figure 1; cf. Vogel 2017; Spinuzzi et al. 2020), not accounting for the more complex, networked relationships across programs through which a venture might pass—programs with varying outcomes, lengths, and cycles. INSERT FIGURE 1 HERE

To better understand the entrepreneurial journey, and specifically how new ventures navigate varying programs, we need a framework for understanding how these ventures are involved with varying, often uncoordinated cycles of development. Steve Blank suggests one: The OODA Loop.

## The OODA Loop

Blank (2013a) attributes Lean Startup’s focus on rapid development and feedback to the OODA Loop, which he drew (loosely) from the work of warfare theorist John Boyd. As mentioned earlier, Blank and other Lean Startup advocates argue that the business plan is too static, slow, and insular to deal with the rapidly changing landscape of business competition. Thus, they argue

for replacing it with more nimble descendant genres focused on continual interaction: the pitch, the Business Model Canvas, and the Minimum Viable Product. These descendant genres are meant to offer hypotheses, test them with rapid audience feedback, and iterate them rapidly, replacing isolation with interaction. Blank justifies the Lean Startup approach by comparing it with “a U.S. warfighting strategy known as the ‘OODA Loop’ articulated by John Boyd and adopted by the U.S. armed forces in the second Gulf War” (2013a, p.27). He promises that “you will use the military concept of OODA (Observe, Orient, Decide, Act) by moving and responding to competitors and customers at a tempo much faster than your competition” (p.221).

Boyd was a fighter pilot for the U.S. Air Force who later studied as an engineer, then became an autodidact military theorist whose readings included Tzu, Clausewitz, and Mao, but also Lenin, Maturana & Varela, Bateson, Polanyi, Kuhn, and Popper. “Some regard Boyd as the most important strategist of the twentieth century, or even since Sun Tzu,” Frans Osinga tells us in his biography of Boyd (2007, p.3), although “on the other hand, his work has invited dismissive critique” (p.1). Complicating Boyd’s legacy is the fact that his body of theoretical work is made up of “four briefings and an essay” (p.1); the briefings are slide decks that Boyd iteratively revised between the 1970s and 1990s. These slide decks were meant to be presented rather than read as standalone documents, and thus pose a problem for those who want to better understand Boyd’s thought.

Boyd made several contributions—for instance, his Energy-Maneuverability (EM) Theory led to the development of the F-16—but is perhaps best known for the concept of the OODA loop, which depicts a cycle in which an agent (which could be an individual or an organization) must Observe, Orient, Decide, and Act in an adversarial environment (Figure 2). An example is that of a fighter pilot, who must Observe (sense) their environment; Orient to (analyze, synthesize) a

threat (an enemy pilot); Decide how to address the threat; and Act on that decision. The pilot then Observes again, beginning a new cycle. More broadly, OODA presented a systemic “model of individual and organizational learning and adaptation” (p.235), a model that Boyd applied to individual pilots, units, brigades, and entire armies.

The OODA loop is conceptual and not really indexed to a fixed cycle. That is, it is not operationalized but rather an analytical aid for separating different things that might overlap. For instance, an observer does not stop sampling the environment in order to feed observations forward into an orientation module, nor does she stop orienting and then decide. However, she does have to orient based on observations, decide based on an orientation, and act based on a decision. OODA thus, like other simplifying schema such as activity systems (Engestrom 2016), provides related analytical concepts for understanding cyclical decisions and acts.

Critically, Boyd argues that “we should operate at a faster tempo than our adversaries or inside our adversaries [sic] time scales ... *such activity will make us appear ambiguous (non predictable)*” (Osinga 2007, p.27, my emphasis). This insight was the kernel that led to his elaboration of the OODA loop. Faster tempo is often better, not because one can outpace the adversary, but because one can appear ambiguous and thus *confuse and disorder* the adversary. (This outcome can be achieved in other ways as well, such as stealth and deception, but speed is the most salient condition in aerial dogfights, the conditions under which Boyd began developing his theory.) In this antagonistic scenario, the goal is to disrupt the adversary’s understanding of the problem: to change the state of things between their OO and DA, while simultaneously guarding against the adversary’s disruption of one’s own OODA loop. If one’s OODA loop is disrupted, strategic thinking becomes impossible because the disrupted agent is reacting to outdated information.

OODA thus describes a tactically oriented systems model of learning, one that is grounded in individuals' experience but that seeks to apply to organizations as well. As Frans Osinga argues, the OODA loop

represents and means more than a decision process, and the model contains more for victory than information superiority and speed. The OODA loop is much less a model for decision-making than a model of individual and organizational learning and adaptation in which the element of orientation—made up of genetics, experience, culture—plays the dominant role in the game of hypothesis and test, of analysis and synthesis, of destruction and creation. (2007, p.235)

For Boyd, this systems model comes from his reading of thinkers such as Bateson (1972, 1979) and Maturana & Varela (1998), from which he took the emphasis on organisms and environment in homeostasis. OODA models an organism's positionality within an environment, with actors pursuing and iterating their own objectives, objectives that may converge.

As Osinga argues, Boyd saw interactions as binding social systems together (2007, p.192). He portrayed this binding interaction with the terms "organism" and "environment," meant literally but also scaled to organizations. He clarified these organism-environment relationships in terms of feedback (Boyd 2018, p.234), and mismatches (p.349), both of which allow the organism to maintain equilibrium with the environment. Without continual interaction with the environment, the system will collapse: the system's internal instabilities can be addressed only through interactions with the environment (2018, p.330). Thus, Boyd saw adversaries as locked in a strategic game of "interaction and isolation ... in which we must be able to diminish [an] adversary's ability to communicate or interact with his [sic] environment while sustaining or

improving ours” (Boyd 2018, p.286). In this adversarial game, “Interaction permits vitality and growth while isolation leads to decay and disintegration” (p.284).

Critically, that interaction could happen across OODA loops, and interferences across these decision cycles could induce isolation. Within the context of military strategy, Boyd noted that each level of a military’s hierarchy has its own OODA loop, which interlocks with loops at other levels: “Each level from simple to complex (platoon to theater) has their own observation-orientation-decision-action time cycle that increases as we try to control more levels and details of command at the higher levels. Put simply, as the number of events we must consider increase [sic], the longer it takes to observe-orient-decide-act” (Boyd 2018, p.90). Since this interlocking can slow or disrupt decision-making, Boyd advocated for centralizing command but localizing control. In this approach, decision-makers have a common outlook (p.92) in which the *what* is agreed upon, but the *how* is left to the officer's discretion (p.94).

Entrepreneurs such as Blank have seen a parallel with entrepreneurship, which (perhaps like warfare) must take in feedback about the environment, strengthen itself, and prevent mismatches. For example, technology entrepreneurs want to “fail faster,” i.e., rapidly gather and adjust to feedback, by testing and discarding hypotheses in a low-risk context—using pitches, business model canvases, and minimum viable products instead of a more static five-year business plan.

The OODA framework, however, has been criticized as simplistic and mechanistic. As Breton & Rousseau (2007) argue, the OODA representation of decision-making does not adequately address interactions in complex environments. Specifically, they say, the level of cognitive granularity is too low to identify design requirements for decision support systems. And although the OODA loop is sometimes portrayed as having multiple loops, they argue, it still suggests a

unidirectional sequence, one that is not dynamic enough to account for ongoing decision-making and does not adequately illustrate iterations within and between phases (p.243). Bryant (2006) similarly argues that the OODA loop overemphasizes data collection (p.186); ignores the role of “top-down” cognitive processes for making sense of perceptions; “does not hint at the necessary dependence of perception on preexisting knowledge and concepts” (p.186); and provides no explicit role for plans, intentions, or goals (p.187). Because it attempts to analytically separate two things that are empirically inseparable—Observe and Orient—the OODA loop cannot account well for sense-making (p.187).

Applied to entrepreneurship, these limitations mean that OODA is oriented to tactical competition, while entrepreneurship also relies heavily on strategic cooperation and cocreation (Vargo 2004; cf. Spinuzzi et al. 2016, 2018). Put differently, OODA can describe the *tactical, reactive* aspect of entrepreneurship, which involves testing and comparing in order to make micro-adjustments. It cannot necessarily describe the movement toward a strategic objective, which involves developing roadmaps and identifying a vision for the venture (a limitation we discuss further in the Conclusions and Implications).

Nevertheless, the OODA loop gives us a way to conceptualize destabilizations that occur through rapid conflicting feedback—an advantage that it has over other social theories that have been applied in technical communication research, such as activity theory, actor-network theory, and distributed cognition (cf. Spinuzzi 2017 on activity theory’s limitations in understanding such destabilizations). Below, we apply OODA to the rapid conflicting feedback and resulting destabilization entrepreneurs experienced in interlinked entrepreneurship programs, centering our investigation on the public Go/No Go Decision that these entrepreneurs were asked to make on Demo Day.

# Methodology

## Site

### *SEAL*

SEAL is an annual summer program designed to help student teams identify and address threats to their new technology-based ventures (Spinuzzi et al. 2018, Spinuzzi et al. 2020). In SEAL, teams examine market interest, technology fit and function, and the ability to create a differentiated value proposition. These teams identify key challenges; test business and technology claims in the marketplace; define their value propositions; and communicate their decision to launch (“Go”), stop development (“No Go”), or change strategy (“Pivot”). During SEAL, teams explore whether a business can be built around a technical innovation (as opposed to starting with a business problem and developing a product to address it). Rather than incubating the technology, SEAL incubates the concept of converting the technology into a business proposition. Firms leave the program with clarity on whether the resulting business is worth pursuing (see Figure 1). Although SEAL originally served just undergraduate student teams at the University of Texas (including students who had been involved in UT’s Longhorn Startup), in 2017 it opened the accelerator program to teams from other universities and to teams that included university faculty (see Spinuzzi et al. 2018).

SEAL is just one program run by the Austin Technology Incubator (ATI). In 2018, ATI also ran the regional I-CORPS Go program.



### *Regional I-CORPS Go*

Regional I-CORPS Go is a three-week program (supported by National Science Foundation (NSF) funds) that taught the fundamentals of “LeanLaunchpad methodology” to “early-stage startups,” according to a one-pager that ATI sent to potential entrants (Document D09; see Table 1). These startups had to be either unaffiliated with a university or based on intellectual property that a university did not own (although they could be university spinouts), and they had to be SBIR Phase 0 teams — that is, they planned to write Small Business Innovation Research (SBIR) proposals to fund their technology development. According to a regional I-CORPS Go flyer,

During the program, teams will be introduced to the fundamental I-Corps principles, helping teams explore the potential value of their research or innovation, and quickly and effectively validate their commercialization strategy. ... Teams will be introduced to the I-Corps approach, and learn about business model development and the customer development process. Teams will also spend time outside the building, talking to customers, partners and competitors, and testing hypotheses. At the conclusion of the program, teams will present their findings from the customer development process and receive real-time feedback from the I-Corps teaching team. (D10)

Two separate regional I-CORPS Go programs (in January-February and in April-May) sourced a total of ten teams, which were also expected to participate in a 7-week national I-Corps program in Fall 2018—but between those two programs, they were required to participate in SEAL 2018: “Teams will participate in a 12-week summer program aimed at helping teams develop pitches and obtain funding. 1-2 in-person days each week in Austin are required during this time” (Document D11). ATI linked the two programs to reduce the amount of time, effort, and funding

of running separate programs. Furthermore, Firm 5 had participated in two regional I-CORPS programs; Firm 8 (a firm in the ATI portfolio, i.e., a longer-term resident of the incubator) had dropped out of I-CORPS (Firm 8 int 2) but planned to participate in programs such as Cleantech Open (Director 2 interview), and entered SEAL 2018 in preparation; Firms 9 and 10 (both I-CORPS teams) had already participated in Cleantech Open before SEAL; and Firms 4 and 9 had not participated in I-CORPS Go yet but planned to do so soon. This interlinking complicated SEAL. As the program director stated after the end of SEAL 2018,

this was a different— Historically, the first eight years, or the first, seven years, it was all UT-only teams. Then for two years, it had teams from other universities but they're still college students, or very recent grads. This year, the bulk of the teams were not students or recent grads, or faculty members. In some ways, an entrepreneur is an entrepreneur, especially at the early stages, but it's a different feel when you have—yeah. (Director 1)

I-CORPS Go entrants are thus different from traditional SEAL entrants in terms of affiliation (non-student, non-academic), experience (typically existing firms), funding sought (SBIR as well as investors), and endpoint (I-CORPS Go firms were committed to the national I-CORPS Go program after SEAL, so they were already committed to a “Go” decision, unlike SEAL entrants). As the program’s director for ecosystem development, S2, told us later, “some of them are down the road too far” (beyond the go/no go decision) and need an incubator, not an accelerator. On the other hand, Director 1 argued that “there’s a series of go/no go decisions” in any business, so SEAL was still applicable.

In addition, I-CORPS Go assumed that firms would spend the time between regional and national programs in customer discovery: “Using the LeanLaunchpad methodology, I-Corps

teaches entrepreneurs how to “get out of the building” and talk to customers to identify the best product-market fit” (document D09), so these entrants had a better understanding of customer discovery than traditional SEAL participants (Director 2). At the same time, they were expected to interview at least 100 potential customers while participating in SEAL, which did not focus specifically on customer discovery but rather on business fundamentals (documents D01-07; observations O0-O9; Firm 2 interview 2). As one of the SEAL program leads reflected later, “There’s a lot put on the back of SEAL this year” (Director 1).

### *Other programs*

As Director 2 alluded, entrepreneurs often sign up for programs, just as marathoners often sign up for running groups and running programs. One I-CORPS Go entrant (Firm 09) told us that he had signed up for 37 pitch competitions before entering this program! Another (Firm 2) attempted to enter a local pitch competition for one idea at the same time they were developing another idea for SEAL.

## Data collection

This program was declared exempt by the authors’ Institutional Review Board. We collected the following data for this project:

- *Interviews with team leads*: Initial audio-recorded interviews with 11 team leads as well as final interviews with leads of 9 of the same 11 teams. (The other two teams did not respond to requests for a second interview.) Initial interviews occurred in the first two weeks of the program, while final interviews occurred in the last two weeks.

- *Interviews with program leads*: Audio-recorded interviews with the SEAL director and two directors of specific portfolios, conducted about two months after SEAL was concluded.
- *Observations*. Observational notes of the kickoff, Demo Day, and eight of the 11 seminar-style workshops that SEAL participants attended.
- *Document collection*: Copies of documents that were involved in the process, including workshop slide decks, video recordings of pitches, surveys of mentors and teams, pitch schedule, program flyers and information, and a summary report.

Table 1 inventories the data. INSERT TABLE 1 HERE

## Sampling

SEAL involved 21 teams. We selected 11 of these teams to examine (Table 2), taking a striated sample of every other team from a table ordered by investment potential as assessed by mentors (IIP score; cf. Spinuzzi et al. 2018). This sampling strategy yielded a mix of different investment potentials as well as participants in I-CORPS Go (6) vs. outside I-CORPS Go but in the local accelerator (1) vs. traditional student teams (4)<sup>2</sup>. We reduced data further by coding data and investigating specific themes (below). Teams were interviewed twice, in the first two weeks and the last two weeks of the program. INSERT TABLE 2 HERE

In addition, we conducted a post-SEAL interview with the program leads (Table 3). INSERT TABLE 3 HERE

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<sup>2</sup> In retrospect, we oversampled the I-CORPS Go teams, although that fact was not clear at the time we took our sample. For that reason, we focus our analysis mainly on the interference between I-CORPS Go and SEAL rather than the student experience, using the student teams mainly to contrast with that experience.

## Data Coding and Analysis

We transcribed all interviews, then coded and triangulated the data.

### *Coding*

We limited coding to three datasets: (a) initial interviews with firms, (b) final interviews with firms, and (c) interviews with program leads. Coding was non-exclusive. Author 2 coded entries under Author 1's direction, initially using descriptive starter codes (Miles, Huberman, & Saldana 2014) based on central concerns, specifically teams' experiences and expectations of the program. Once starter codes were applied, Author 1 performed open coding (Corbin & Strauss, 2008) to inductively identify recurrent themes related to teams' perceptions of the program, its clarity, its criteria, and its central Go/No Go decision. Finally, Author 1 coded The appendix shows selected starter and open codes.

Once we identified themes in codes, we used other datasets to confirm and illustrate them, examining how observations, documents, surveys and pitches related to the interview data.

### *Triangulating*

We also triangulated datasets, comparing interview statements with each other and with other data. Specifically, we triangulated firm interviews with

- each other
- directors' interviews
- program documents (D01-D13)
- surveys (S1-S3)
- observation notes (O0-O9)

We grounded our analysis in the Decision point, since it was the most visible and observable part of the OODA cycle, then worked backward through the interviews to understand earlier parts of the cycle.

Below, we discuss and analyze the results.

## Results and Analysis

As mentioned, this was SEAL's 10th year, but its first year to be integrated into I-CORPS Go. Student teams were not informed about the linkage; I-CORPS Go teams were informed in a flyer, but were not informed that SEAL was a student-oriented accelerator—just that it was a required phase (originally billed as a 12-week program; Document D11).

Consequently, many teams expressed surprise or confusion about the relationship. As a student team (Firm 1) said, “One thing that struck me really hard, I was so confused, is that SEAL is a student entrepreneur launch accelerator. We are probably the only one or two student teams. I'm confused. What the heck is going on?” (interview 2). Firm 1 was incorrect about the number of student teams—as mentioned, SEAL had nine traditional student teams—but the I-CORPS teams generally had different “demographics” and their firms and R&D efforts were much farther along (as Firm 11, another student team, noted in interview 2), a fact reflected in their pitches (O0, O9) as well as their interactions and concerns during workshops (O1-O8). Other evidence of the dual orientation of this year's SEAL included a new workshop on Small Business Innovation Research (SBIR) grants, which applied to I-CORPS teams but not student teams.

What was going on was a challenge that went beyond the often disorienting process of learning how to be an entrepreneur: how to understand the relationships among different entrepreneurship

programs and experiences, including how they impacted and interfered with each other. In the analysis below, we will take up this question, examining how firms observed, oriented, decided and acted based on the information they had. We began with the Decision, since firms were asked to articulate a specific decision at the end of the program (the Go/No Go decision; cf. Spinuzzi et al. 2020). In addition, firms were able to articulate other decisions during their interviews. After establishing what their articulated decisions told us about how they understood the program, we worked backward, looking for evidence about how they Observed and Oriented. Since Acts were generally in the future, and were thus articulated as intentions based on the Decision, we do not address them here.

## Decide

Even SEAL's program directors seemed to have different ideas about what the program was supposed to offer in terms of decision points: Director 1 asserted that the program was always applicable because firms faced an infinite number of decision points: "There's a series of go/no-go decisions that you make for infinity. ... It's just a matter of winding up, is there a near one coming up that this type of structure can help the team tackle?" In contrast, Directors 2 and 3 thought that SEAL was more applicable to firms that had not yet begun customer acquisition (i.e., had not turned their venture concept into a venture opportunity to be exploited; see Figure 1). INSERT FIGURE 1 HERE

Despite the go/no go premise of SEAL, firms could and did make various decisions at the end. Importantly, firms did not necessarily distinguish among these decisions, sometimes characterizing themselves in multiple categories—which is to say that the different decisions are not necessarily well bounded. These decisions included three mentioned in the SEAL program

documents (“Go,” “No Go,” and “Pivot,” as described in introductory slide decks for kickoff and Demo Day) as well as three others: “We’ve already been funded”; “We can’t say” and “Nobody told us.”

### *Making a Go decision*

Across SEAL, 12 of the 21 teams made explicit Go decisions (including six of the teams in the study sample). These included nine of the 11 I-CORPS teams (including four of the six I-CORPS teams in our sample: Firms 4, 5, 6, and 9) and three of the 10 non-I-CORPS teams (including two of the five non-I-CORPS in study: one student team [Firm 11] and one non-student team [Firm 8]).

The one student team in the sample that was a Go, Firm 11, explained that they had come into SEAL with “a pretty polished product” and they had spent the summer “figuring out our sales approach” and developing a focus in communicating its value proposition (interview 2). They had declared at the beginning of the program that they intended the firm to be a Go (interview 1), and added that they hadn’t even realized that the go/no go decision was part of the program’s framing: they had planned to test their business and develop an expansion plan. They were already beyond their Go decision.

The one non-student, non-I-CORPS team, Firm 08, similarly had not seriously considered a No Go decision, since he was already in the Austin Technology Incubator and was using SEAL as an opportunity to prepare for another competition, Cleantech Open, as well as further developing a business that had already been established. Like Firm 11, he had already passed the Go decision and was committed to it due to investors, customers, his incubator, and his commitment to Cleantech Open. He expressed confidence that the firm had validated its venture concept and



was ready to exploit it: “It's a Go for us because ... we've done enough validation work. We're far enough along and have done enough of the work to feel like we're confident and that we can take this to market and be successful in one of the segments” (Team 8, second interview).

The four I-CORPS teams in our sample with a Go decision all claimed that the SEAL Go decision was by default, since SEAL was a step toward what they considered the actual Go/No Go decision, which would take place in the I-CORPS national program. As Firm 5 put it,

I'm confident I'll be able to say we have a green light, we're going to continue, go through this national program, and that we're almost going to have another red light/green light after nationals. That's really our true red light/green light test. ... I don't think a single team will say red light just because I heard [a SEAL director] talk about this ... we had the highest or the biggest number of funding teams, highest-funded cohort ever of SEAL. That was mainly because of the NSF teams. It's really hard to say a no-go for NSF teams because nationals hasn't started yet, and the point of nationals is to figure out the best path to success. (Interview 2)

For these teams, the SEAL Go decision was really a false decision, one that was overridden by their commitments to I-CORPS.

### *Making a No Go decision*

In contrast, only one team in the entirety of SEAL explicitly made a “No Go” decision: Firm 3, which was in our sample. Firm 3 was a student team, with the student proposing a new product to be marketed by an existing firm (a firm that was successfully developed in a previous year of SEAL). Thus their “No Go” decision applied to the proposed new product rather than the firm itself.

However, we might also count teams 7, 101, and 104, the three student teams that “just kind of imploded” (Director 2 interview). Speaking of Firm 7, the program director remarked, “the pressure test of SEAL actually worked on the team dynamics in this case.” This firm, which was in our sample, intended to “Go” as late as our second interview, the week before the Demo Day pitch. However, by Demo Day, our interviewee concluded that her business partner simply was not as committed to the firm as she was. Director 1 viewed these implicit “No Go” decisions as a positive outcome—an outcome that SEAL was geared to produce. It was better for them to find out now than later, once they had sales and commitments.

Strikingly, all of the “No Go” teams were student teams. For them, the end of SEAL marked the potential end of the journey, a decision about whether to execute or not (Figure 1). Since they did not have upcoming commitments the way the I-CORPS teams did, they could make a genuine decision.

### *Pivot*

A *pivot* involves rethinking key parts of one’s firm before continuing. Pivots include fundamental moves such as reorienting to a different product or market or moving to a new business model. For SEAL 2018, Director 1 told us, “there are three pivots that were noticeable. Lots of tweaks, I’m sure, but there’s only three top-level pivots. Out of 21, that’s what I remember. ... Or maybe four.” We counted three.

Two teams explicitly announced a pivot in their Demo Day pitch: Firm 1 and 106, both student teams. Firm 1, which was in our study sample, pivoted—in the view of the SEAL directors—because their team was large, their internal cohesion was weak, and their vision of the proposed service was not sufficiently developed. However, the research team had trouble understanding

Firm 1's explicit reasoning; we agree with Director 1 that "The presentation at the end was incoherent."

One team implicitly pivoted: Firm 2, an I-CORPS team, which Director 1 characterized as "way too early." Firm 2 told us: "We've already pivoted twice and we've sort of pivoted a third time. We don't know what's going to happen. It's a go in that we're going to continue customer discovery, but we don't know what's going to happen in the end once we're finished with the I-CORPS Go process six weeks from now."

Director 1 remarked that it was harder for more established firms to pivot:

Some of the companies have *raised enough money* where they're going down the pathway and they've already convinced themselves of what they're doing. They've had investors validate that. It's harder to iterate and harder to pivot at that point in time.

The I-CORPS sourced teams— Some of those pivoted, most did not. What I'm pausing to think about is most of them— *I don't think any of them had actually done their hundred customer interview discovery things*. So what's the point of pivoting if you haven't talked to customers? (Director 1, our emphasis)

We think the emphasized points are key. A firm pivots when it finds that its envisioned configuration does not sufficiently address the market, problem, or other needs—when that configuration has been tested and found wanting. But, as Director 1 argues, many firms were not in that position. On one hand, some firms had already had their decisions validated: they had already raised money, and thus had committed to a path. On the other hand, I-CORPS teams by definition could not make a true Pivot decision yet, since they were supposed to be validating their configuration via customer interviews—interviews that should be completed before they

entered the national I-CORPS program. Firm 2 alluded to the latter issue when they told us “It's a Go in that we're going to continue customer discovery.”

*We've already been funded*

Two teams, neither of which were in the study sample, received funding during SEAL, making the Go/No Go decision moot—although Firm 110's slides also declared a “Go.” Firm 110, an I-CORPS team, outlined how they had managed to grow strictly through sales rather than relying on investment; their concluding slide was oriented to other participants, telling them, “Key lesson: You don't need investors to crush it.” Firm 107, a student team, did not bother showing up for Demo Day: after receiving investment early in the summer, they ceased all SEAL activities (interviews with Directors 1 and 3).

*We can't say*

As mentioned earlier, these decisions are not exclusive. Two teams, both in I-CORPS and both in our sample, declared in their second interviews that they couldn't really make a decision, and they both avoided claiming a decision on Decision Day.

Firm 2, which was mentioned earlier as a pivot, also declared that they could not make a decision because they were committed to the national I-CORPS program:

We're going to find out if this product is worth pursuing or not. We're going to find out more about how you would sell it. ... We're in the stage with I-Corps. We're supposed to not know what things are yet. We're still supposed to be learning. *If we say we know what we've got, then we're not doing the program right.* ... We don't know for sure yet if we're going to have something that makes money or not, because we're not going to do it as a hobby.” (Firm 2, interview 2)

Firm 10 similarly told us that the Go/No Go decision would be determined in the national I-CORPS, not in SEAL, so his presentation would outline “next steps” (which it did).

### *Nobody told us*

Finally, three of the firms in our sample said that although they would declare a decision, they had not realized that SEAL’s core tenet was the go/no go decision.

For instance, although they declared a Go decision, student team Firm 11 remarked: “Maybe it would have been different if our expectation originally had been set to ‘This is the no-go or go.’ When that was said on the first day I was like, ‘Oh, oops.’ ... the fact that we didn't know this was a ‘no-go/go’. If that's the core tenet of the program, that's surprising that we had no idea.” (interview 1).

Similarly, I-CORPS team Firm 6 said, “I don't even think they asked for a go/no-go discussion.” Firm 5 similarly told us: “I know NSF was kind of test-piloting this. I had no idea what I [was] getting myself into. They just were like, ‘Hey, we got this cool partnership with SEAL.’ They didn't tell us what SEAL was. ... Then, we sit down the first day and they are like, ‘OK, it's red light/green light, mini-accelerator.’” (SEAL’s advertising said SEAL participants would “tackle the most difficult, deal-killing questions of their new ventures,” but did not explicitly lay out the Go/No Go decision.)

## Observe and Orient

In SEAL, firms attempted to *Observe* how the program worked and how it related to other programs. Yet these observations were often fragmentary and firms had different models in mind. Student teams in our sample (Firms 1, 3, 7, 11) had previously been involved mainly in university-based programs, and thus had a vague idea of how the I-CORPS firms were involved.

On the other hand, I-CORPS teams in our sample (Firms 2, 4, 5, 6, 9, 10) did not seem to understand the relationship either. As Firm 10 stated,

I didn't know much about the SEAL program. My point in going to the SEAL program was, it was part of the NSF I-CORPS program. What the UT did was they have a hybrid where chemically the I-CORPS was mainly for the academic teams. They want to expand it to non-academic teams. What they did is they created a power program called I-CORPS Go. They're mixing the NSF grant for successful regional teams to also go through the ATI SEAL program. We were automatically enrolled in this. (Firm 10, interview 1)

Similarly, Firm 9 said that “a lot of the companies or ideas coming into SEAL are in a significantly earlier stage than we are” (interview 2), and Firm 6 interpreted SEAL as serving “potential startups, fledglings like ourselves” (interview 2). Firm 6 also asked the interviewers: “Has SEAL been exclusively for UT students? I'm sure it's developed for the diversity of the folks going through SEAL” (interview 1).

The firms' understandings of SEAL were partly based on their own experiences and journeys. Firms mentioned participating in a total of 21 named programs, accelerators, incubators, events, and entities—as well as an unspecified “37 pitch competitions” in which Firm 2 had participated (Figure 3). INSERT FIGURE 3 HERE

Firms Oriented to SEAL in relation to these different experiences. On one hand, student teams understood SEAL as a student-focused program and were confused about why it involved so many non-student teams: “One thing that struck me really hard, I was so confused, is that SEAL is a student entrepreneur launch accelerator. We are probably the only one or two student teams.

I'm confused. What the heck is going on?" (Firm 01). On the other hand, I-CORPS teams did not have a strong idea of how SEAL was meant to help them, with one team bluntly declaring that "They put us into [SEAL] as a placeholder" (Firm 09).

As Figure 3 shows, several firms—including the six I-CORPS firms and the one ATI firm in our sample, but none of the student teams—followed a pathway from one experience to SEAL to another experience (bold arrows). Thus they interpreted SEAL as part of a larger, structured journey.

## Patterns of conflict across programs

In one OODA briefing, *Patterns of Conflict*, Boyd (2018) advocates grand tactics to be used against adversaries in warfare. One of these grand tactics is to "Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos . . . and/or fold adversary back inside himself [sic]" (p.152). Here, Boyd is describing deliberate isolation of an adversary from its environment, a move that makes decision-making impossible. But as our above results suggest, some firms in SEAL similarly had trouble making a specific decision, and they similarly encountered "uncertainty, doubt, mistrust, confusion, disorder" (although none of them mentioned fear, panic, or chaos). These firms often attributed the uncertainty, confusion, and disorder to SEAL itself: In the summary report (D12), for instance, one firm claimed that "there was a lack of cohesiveness" in SEAL. Firms 1, 2, 5, 6, 8, and 11 characterized SEAL as disorganized or discohesive<sup>3</sup>, with Firms 2, 5, 6, and 8 specifically complaining that pitch criteria were not clear. And as we saw earlier, some firms

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<sup>3</sup> Interestingly, SEAL appeared to be organized in the same way as previous years (see Spinuzzi et al. 2018, Spinuzzi et al. 2020), with workshops and lunch-and-learns covering the same topics, in the same order, and in one case with the exact same presentation.

stated that they either had not been told that they should make a Go/No Go decision or felt unable to make such a decision due to commitments to other programs.

This inability to make the Go/No Go decision—the entire point of SEAL and the principle around which it was structured—is concerning. As Director 2 stated in her interview,

The secret sauce behind SEAL is having teams take a hard look at either different projects or either their company on the whole and being willing to kill it if there's not a path forward for them. That requires a different level of analysis. If companies are coming in with something built in that incentivizes their participation and not killing it, I don't know how authentic that examination was all the time.

Yet, both in terms of their positioning within the program and their stage of customer validation, the I-CORPS teams were incentivized not to kill their projects. In fact, more broadly, SEAL's rationale and structure faced interference from the conflicting intentions of I-CORPS and other programs.

#### *Framing of I-CORPS overrode SEAL's orientation*

As we've seen, the framing of I-CORPS overrode SEAL by making a decision other than Go impossible. (As we've seen, one I-CORPS firm did Pivot, but even they did not declare that Pivot in their Demo Day pitch.) So what did they think SEAL was good for? I-CORPS firms interpreted SEAL differently: one considered it to be an irrelevant “placeholder” (Firm 9), two interpreted it an opportunity to do customer discovery (Firms 2, 9), and one considered it to be a space for improving pitches and acquiring customers (Firm 6). None described it the way that SEAL itself did, as an *acceleration and launch* program oriented around the launch decision.



*Framing of other pitch competitions overrode SEAL's pitches*

All of the firms, both I-CORPS and non-I-CORPS teams, had some experience with other entrepreneurship programs, most of which were structured as pitch competitions. At least two believed that the point was to hone a pitch that would be perfect for any rhetorical situation. As mentioned, Firm 9 said he had honed his pitch over 37 such competitions, using A-B testing to determine what words and gestures he used. He clearly thought that a pitch should be in one genre and could be honed for all audiences. Similarly, Firm 8 wanted to see “a consistent model [of pitch] of a single topic” and complained that “I don't get consistent feedback”; he had never been offered a workshop “that was just specifically on getting it to a final pitch to where it's perfect.” Unfortunately, this arhetorical understanding of the pitch genre does not support the different functions and different audiences to which pitches must be oriented.

Firms 2, 5, 6, and 8 had the opposite complaint: they complained that SEAL's pitch criteria were not clear. In addition, Firm 11 had not heard about the decision orientation of the pitches. Here, Firm 2's two participants discussed the reactions to their first pitch:

Firm2A: I found that the questions [on which the pitch was evaluated] were disjointed from what we were asked to do. What we were asked to do was not an investor's pitch, but the questions that they were asked to evaluate were based on an investor pitch. ... Some of the people just wrote, "They aren't even supposed to do this yet."

Firm2B: Some of the other people wrote, "I want to see numbers."

Firm2A: Then they just rated us low. (interview 1)

Firm 6 complained that “looking at what was sent out in terms of what to prepare to present didn't really match up with what it looked like the judges were judging on.” And “We're not sure,

on the first pitch, what they were really asking. It turned out that what they asked everybody to write up was very different than what we talked about.” And Firm 5 complained: “All they told us initially was there's this seven to eight-minute pitch and to pitch. ... It wasn't until the night beforehand we got something, then they extended the deadline to two more days. But what he wanted us to pitch on was just four things” (interview 1). In short, absent explicit advice about how to structure their pitches, the firms based their Decisions on their experience with other programs, programs with different orientations.

## Conclusions and Implications

### Conclusions

Was SEAL described in confusing and unclear ways? To an extent. We agree with the teams that SEAL's messaging was not strong in its materials—although it did mention making teams making decisions and although the Go/No Go decision was implied in the last letter of the acronym (“Launch”). However, SEAL had used similar messaging in previous years and had structured its program in substantially the same way, and firms in those previous years seemed to be less confused about its orientation. The main difference in 2018 was that, for a substantial number of teams, SEAL was positioned as part of I-CORPS Go. In retrospect, its Go/No Go decision was incompatible with that larger program.

By applying the OODA loop, starting with the visible Decision point, and tracing back to the Observe and Orient points, we found that teams had trouble making the envisioned Decision because their participation in other programs (especially I-CORPS) made that decision impossible. Furthermore, the orientations learned in other programs did not match SEAL's.

Teams reacted by attempting to interpret SEAL as part of a larger journey across programs. In doing so, they encountered difficulty in understanding what their pitches were supposed to do, what criteria they should meet, and how they would be evaluated. In OODA terms, they had trouble Orienting appropriately, leading to different or delayed Decisions, due to the interference in the differing goals and cycles across the linked programs. To quote Firm 6 again, “They're happening over and over again, and they're happening all together.” And since the entrepreneurs had to be oriented to these multiple goals and cycles, they had trouble interpreting the decision point, and therefore could not effectively communicate and justify their SEAL decisions.

They also lacked internal metrics for making that critical decision. What was the minimum metric for making a “Go” versus “No Go” decision? Ultimately, it was in the willingness of the participants to “soldier” on, not in a criterion, heuristic, or metric. Thus, for SEAL, the pitch described a decision but not a direction: It answered questions such as “Where we are now?” and “What we propose to do next?” but not “Why should we continue to exist?” or “What will we ultimately accomplish?” The data were not funneled into a decision process whose deciding factor came from external data such as market interest or acceptance. That is, the OODA process was successfully run—but in a continuous loop, without strategic direction.

Consequently, entrepreneurs in SEAL engaged in cycles of small, tactical adjustments in the venture: comfortable micro-adjustments oriented to program mentors and materials, largely yielding comfortable “Go” decisions based on successfully following the SEAL process. In contrast, larger strategic adjustments require feedback directly from the market(s) that the entrepreneurs seek to engage—feedback such as market interviews (e.g., the 100 interviews that teams had to conduct for I-CORPS Go) or a robust market report (e.g., Spinuzzi et al. 2016). Small, tactical adjustments may have fit SEAL’s goal to “stress-test” ventures before they

entered the exploitation state, but did not match I-CORPS's objective of identifying larger (and less comfortable) strategic macro-adjustments, nor did they serve other accelerators' focuses on issues such as funder interest. The programs in Figure 3 had different cycles in part because they had different objectives.

## Implications

Up to this point, studies of entrepreneurship training programs have examined these programs separately. Consequently, such studies have tended to focus on a bounded set of objectives and how the programs meet those objectives.

However, as discussed here, entrepreneurs often go through multiple programs, some simultaneously. In those cases, these entrepreneurs may have difficulty understanding how program goals differ—or even how pitches themselves orient to different purposes, stages, and audiences. In this study, teams' previous and overlapping entrepreneurship programs demonstrably impacted how they interpreted and addressed the goals in the current one. Since this is not a novel situation—entrepreneurs, like runners, tend to sign up for many programs (Director 2)—studies of entrepreneurship programs need to take such interferences into account.

In this study, we used OODA to analyze such incidents of interference, partly because it is already used in Lean Startup, partly because it was developed with such interference in mind. In such cases, OODA provides a model and conceptual language for describing tactical interferences across cycles. However, it does not provide adequate apparatus for analyzing strategic decisions or for understanding meaning-making in social or cultural terms. For instance, “cultural heritage” is relegated in the OODA model to the Orient part of the loop, along with “genetic heritage” and “analysis and synthesis”—a quite limited and underexplored role,

especially given what we know about how cultural and social expectations impact observations, decisions, and actions. In subsequent studies, OODA could be paired with a social theory with these strengths in order to provide more insights. Doing so would likely entail developing rapprochement across the theories so their insights could be gracefully paired. Some early work has been done to put OODA in conversation with one such theory, activity theory (Dias et al. 2018; Gonçalves et al. 2013), but the work is not yet developed to the degree necessary.

Additionally, we studied the question of interference in a central case that was linked to other programs, exploring interference primarily through interviews. Subsequent studies should, if possible, investigate connected programs in a more thoroughgoing way, ideally involving observations and artifact collection in two or more programs. More broadly, studies of business-related communication and persuasion may need to take into account the interfering cycles that affect the activity under study.

Finally, based on these findings, we suggest that accelerators explicitly lay out their objectives and how these might relate to other entrepreneurship programs. Since entrepreneurs undertake many programs simultaneously or serially, they need guidance in how to interpret relations and objectives among them. Beyond framing, entrepreneurs could benefit from regular, explicit goals that explicitly orient to the program's tactical or strategic objectives.

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## Appendix: Selected Codes

| Code                 | Description  | Example   |
|----------------------|--|---|
| <i>Starter codes</i> |  |   |
| ENTITY_CUSTOMER      | Describes interactions and relationships with customers          | "That's something we've worked on and got a lot of feedback. We're still in the discovery stage where we need to do a lot more customer interviews. Two of the primary things we're looking at are focusing on neurosurgery and trauma surgery. Areas where they either don't have great vision or there's no feedback. Right now, there just currently isn't feedback. The value proposition would probably be reducing complication rate, things like that." (Firm 4) |
| ENTITY_INVESTOR      | Describes interactions and relationships with investors          | "I had been pushing [Name] to get in front of investors even though he wasn't really ready. Because I just feel like the more get you out and have to articulate what it is you do, across a breadth of an audience, or wide array of people, the better you get at it. So I pushed him, actually signed him up for NSF I-CORPS. He didn't know it." (Firm 6)   |
| ENTITY_STAKEHOLDER   | Describes interactions and relationships with other stakeholders | "We are providing an opportunity for lenders, borrowers, and community members to interact with one another to provide each other with financial opportunities instead of forcing people to rely on institutions, such as payday lenders, to have to borrow money and help make ends meet." (Firm 1)  |

|                    |   |  |
|--------------------|---|--|
| EXPECTATIONS       | Expectations about SEAL   | "I know NSF was kind of test-piloting this. I had no idea what I getting myself into. They just were like, 'Hey, we got this cool partnership with SEAL.' They didn't tell us what SEAL was. They are just like, 'You're going to get this really...'. There was an intro to the Austin entrepreneur ecosystem, and you'll meet a ton of investors. That's what they told us. Then, we sit down the first day and they are like, 'OK, it's red light/green light, mini-accelerator.' You're like, 'Oh, OK.' We didn't know what we were getting ourselves into. I think that took a lot of SEAL teams by surprise." (Firm 5)   |
| EXPERIENCE_NSF     | Experience with the NSF, including I-CORPS                            | "We have completed two regional I-Corps programs and we start our national I-Corps program in the fall." (Firm 5)  |
| EXPERIENCE_PROGRAM | Experience with entrepreneurship programs                             | "[laughs] Then when I came to UT my first year, I discovered this world of entrepreneurship and dove in. In the past four years at UT, this will be my third company. Granted they've had varying levels of success, I don't think that's too exciting by any means, but it was awesome practice. I learned a ton through those ventures. Then I also co-founded on campus UT's first pre-seed capital fund for student start-ups. It's called the Genesis Program. We recently raised over 1.2 million. That has been a really cool opportunity for me to see the other side of the table. I learned a lot through Genesis that we work on here at [Firm 11], just learning what other companies are doing and also learning what mistakes they're making, so we don't make the same mistakes." (Firm 11) |
| GENRE_PITCH        | Discussion of the pitch genre: What it does and where they learned it | "over 2016 and 2017, I realized that this needed to be addressed. I signed up to every pitch competition trial, every one I could get my hands on, 37 in total. I started literally AB testing every word in my pitch. Once I felt that was at least appropriate, I started AB testing my body movements." (Firm 9)  |
| SEAL_CONS          | What the participant perceived as SEAL's drawbacks                    | "When you have a student program, it needs to be really, really clear about it's a student program and allow the students to engage. " (Firm 1)  |

|                   |   |   |
|-------------------|---|---|
| SEAL_PROS         | What the participant perceived as SEAL's benefits                   | "My goals for the summer in SEAL...I feel like I have a broad understanding of a lot of different aspects of business, but I'm hoping that this will give me a more in-depth understanding of the various things like financial models. That's something that I never really thought I could do. I was like, ""Oh my God. That's so insane. That's so crazy."" That presentation yesterday made me so excited. I literally sent Alex an email that I was like, ""Oh my God. I'm so excited about financial models. I already plugged some numbers in. Check this out."" Like at 1:00 AM, I'm working on this. It gets me excited about all of this." (Firm 7) |
| SEAL_vs_ICORPS    | How the two programs differed, in the perception of the participant | "One thing that struck me really hard, I was so confused, is that SEAL is a student entrepreneur launch accelerator. We are probably the only one or two student teams. I'm confused. What the heck is going on?" (Firm 1)  |
| <i>Open codes</i> |   |   |
| disorganized      | Describes SEAL as disorganized                                      | "Yeah. I think one thing that would be useful in all of these programs is that we need a consistent model of a single topic..... If I were to say that they all overlap quite a bit, but what I'd like to see a little different is that somebody does a series just on pitching, just on funding. Not one class but three of them so that they can see that my performance in that area is better." (Firm 8)   |

|                      |  |   |
|----------------------|--|---|
| gng                  | Describes the Go/No Go decision  | "I would argue, and [Director 1] alluded to this in the last session, almost nobody says it's a no-go. [laughs] It's natural that you expect most people to think, "'I'm doing this. This is going to be the rest of my life.'" The question is, will the market respond the same? I guess that's what we'll find out."   |
| pitch_criteria       | Describes how the participant understands pitch criteria in SEAL and elsewhere                             | "Big disjoint between what we were asked to do, and what they ask to evaluate." (Firm 2)  |
| programs_mentalmodel | Describes or implies how the participant understands entrepreneurship programs, including SEAL and I-CORPS | I didn't know much about the SEAL program. My point in going to the SEAL program was, it was part of the NSF I-CORPS program. What the UT did was they have a hybrid where chemically the I-CORPS was mainly for the academic teams. They want to expand it to non academic teams. What they did is they created a power program called I-CORPS Go. They're mixing the NSF grant for successful regional teams to also go through the ATI SEAL program. We were automatically enrolled in this. I didn't know much about it but so far I've been very impressed. I've been impressed by the quality of the programming, also by the sophistication of the other startup teams. I thought there were lot of great pitches. Usually when you hear pitches, there's always a few bad ones. I didn't see one bad one out there. |



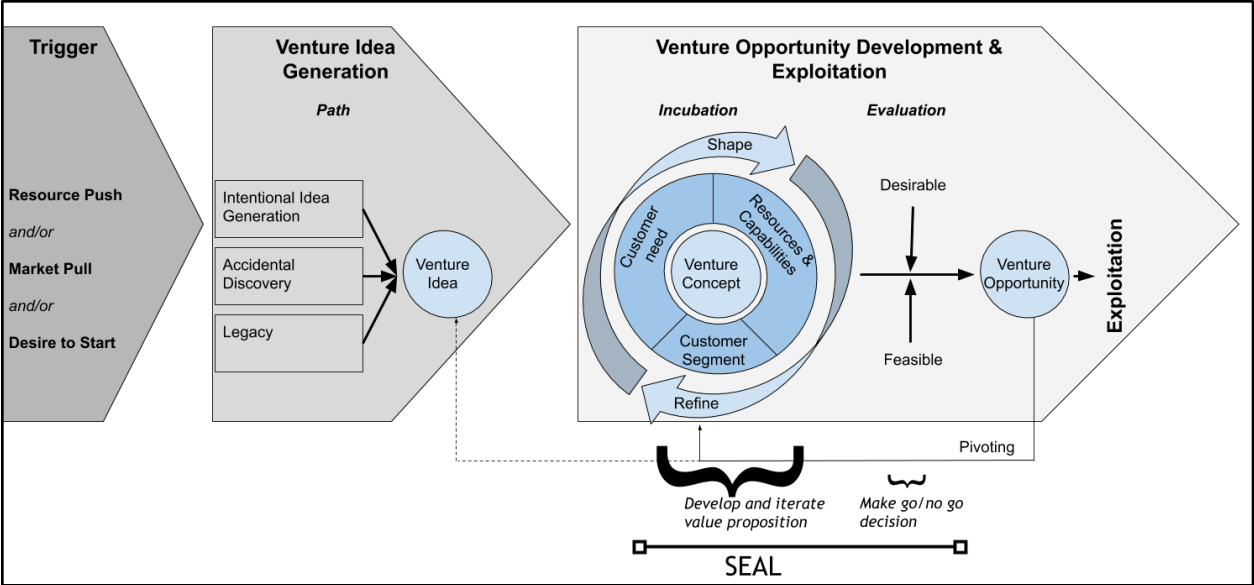
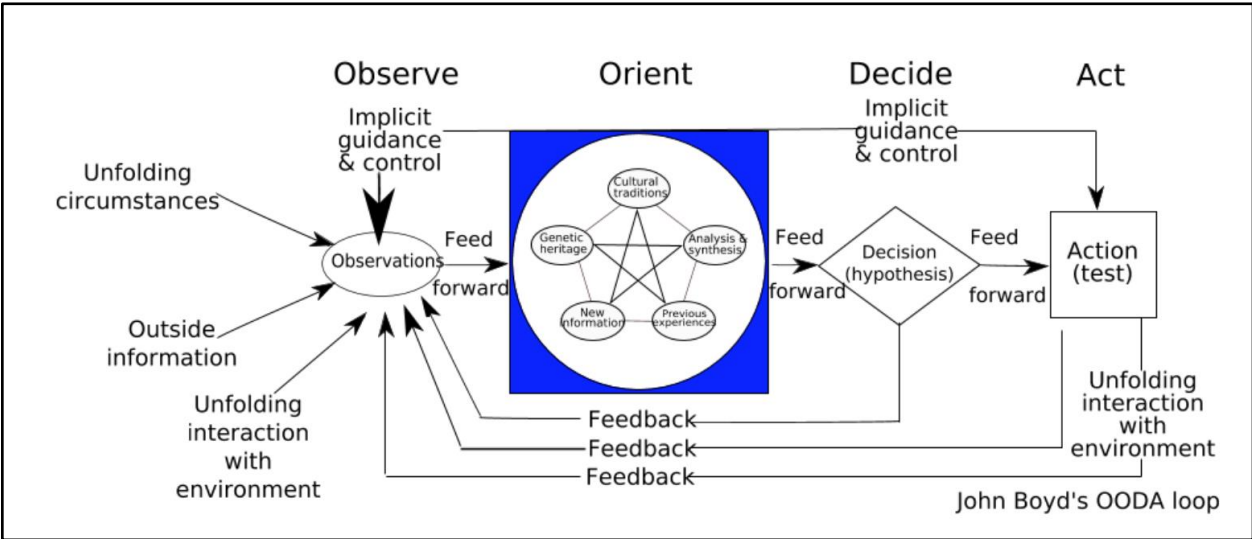
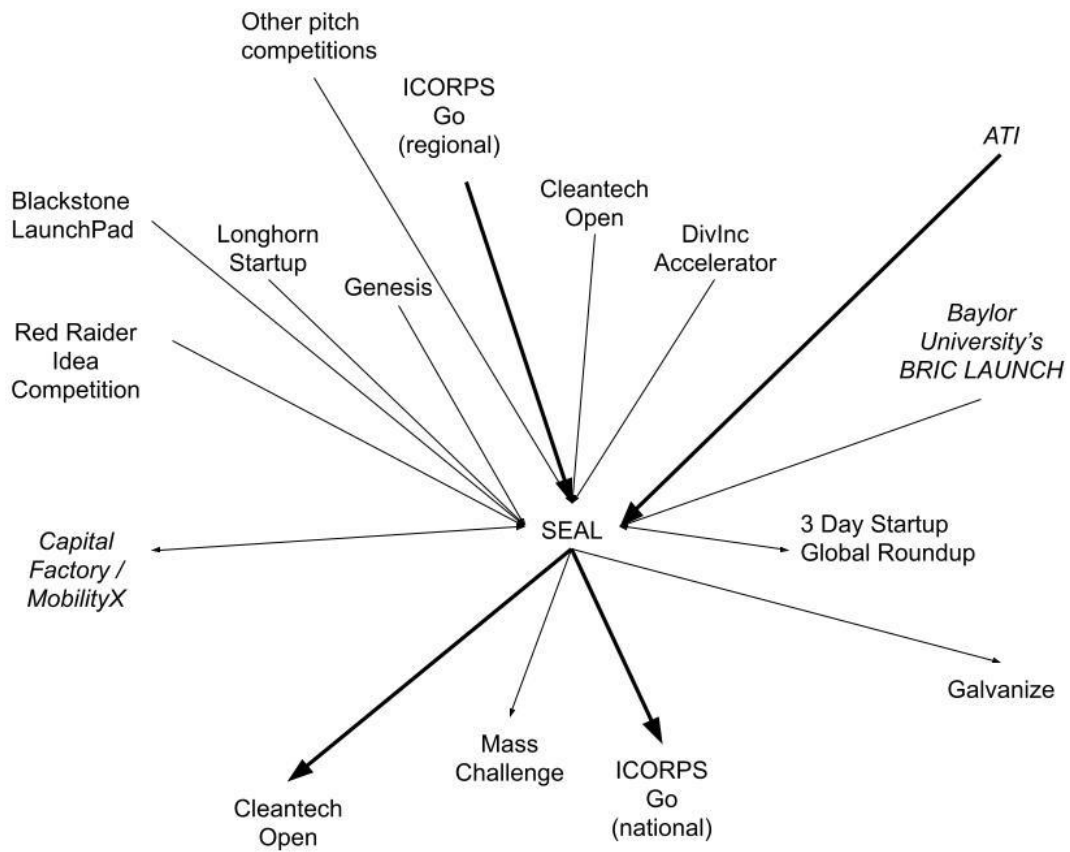


Figure 1. The Vogel cycle, with SEAL superimposed (Based on Vogel 2017).





**Figure 2.** The expanded OODA loop. (Figure by Patrick Edwin Moran, used under Creative Commons license CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=3904554>)



**Figure 3.** Programs, accelerators, and incubators in which SEAL participants reported participating.

**Table 1.** Data collected for this project.

| <b>Category</b>            | <b>ID</b> | <b>Data</b>  | <b>Number</b> |
|----------------------------|-----------|--|---------------|
| Interviews                 |           |  |               |
|                            | IIT 01-11 | Initial interviews with teams (see Table 2)                | 11            |
|                            | FIT 01-11 | Final interviews with teams (see Table 2)                  | 9             |
|                            | ID 01-03  | Interviews with program directors (see Table 3)            | 3             |
| Video pitches              |           |  |               |
|                            |           | Initial pitches  | 18            |
|                            |           | Final pitches  | 17            |
| Documents: SEAL program    |           |  |               |
|                            | D01       | SEAL kick-off pitch schedule                               | 1             |
|                            | D02       | Final SEAL kick-off pitch schedule                         | 1             |
|                            | D03       | Financial Modeling (slide deck)                            | 1             |
|                            | D04       | IP Law (slide deck)  | 1             |
|                            | D05       | Sales, Marketing and Go-To-Market Strategies (slide deck)  | 1             |
|                            | D06       | SBIR and STTR Grants (slide deck)                          | 1             |
|                            | D07       | Attendance   | 1             |
| Documents: I-Corps         |           |  |               |
|                            | D08       | I-CORPS (SEAL) report.docx                                 | 1             |
|                            | D09       | Go_onepager.docx   | 1             |
|                            | D10       | Regional Program Flyer_UT Winter 2018                      | 1             |
|                            | D11       | Flyer_go spring 2018.pdf                                   | 1             |
| Documents: Summary reports |           |  |               |
|                            | D12       | 2018 SEAL Summary.docx                                     | 1             |
|                            | D13       | I-Corps Go (SEAL) report.docx                              | 1             |
| Surveys: Mentor feedback   |           |  |               |
|                            | S1        | 2018 ATI SEAL-I Corps Kickoff Feedback Form Responses.xlsx |               |

|                        |    |  |   |
|------------------------|----|--|---|
| Surveys: Team feedback |    |  |   |
|                        | S2 | weekly surveys   | 5 |
|                        | S3 | summary  | 1 |
| Observation notes      |    |  |   |
|                        | O0 | Kickoff  | 1 |
|                        | O1 | Financial Modeling   | 1 |
|                        | O2 | IP law   | 1 |
|                        | O3 | Maker Spaces, Prototyping and Engineering                              | 1 |
|                        | O4 | Sales, Marketing and Go-To-Market Strategies                           | 1 |
|                        | O5 | SBIR and STTR Grants   | 1 |
|                        | O6 | Fundraising  | 1 |
|                        | O7 | Storytelling   | 1 |
|                        | O8 | The Austin entrepreneurial ecosystem, other accelerators and resources | 1 |
|                        | O9 | Decision Day   | 1 |

**Table 2.** Selected teams participating in SEAL.

| <b>Firm ID</b> | <b>IIP score</b> | <b>Sector</b>             | <b>Description</b>  | <b>Interview 1 Length</b> | <b>Interview 2 Length</b> | <b>I-CORPS?</b> |
|----------------|------------------|---------------------------|---|---------------------------|---------------------------|-----------------|
| 01             | 2.00             | Finance                   | Credit scoring and lending services                               | 18:20                     | 21:48                     | No              |
| 02             | 2.60             | Transportation & Mobility | Predictive analytics simulator for traffic issues                 | 16:48                     | 37:40                     | Yes             |
| 03             | 2.67             | Healthcare                | Mobile-first health informatics system for developing communities | 14:06                     | --                        | No              |
| 04             | 3.00             | Bio/Health Sciences       | Monitoring of electrosurgical hemostasis process                  | 11:15                     | 23:07                     | Yes             |
| 05             | 3.17             | Bio/Health Sciences       | Preventing vehicular heatstroke of infants left in cars           | 12:24                     | 14:34                     | Yes             |
| 06             | 3.25             | Bio/Health Sciences       | Remote behavioral monitoring for families and caregivers          | 22:31                     | 14:45                     | Yes             |
| 07             | 3.50             | Misc services             | Citation machine for law documents                                | 11:10                     | 15:30                     | No              |
| 08             | 3.60             | Water & Food              | Smart submetering for water                                       | 10:24                     | 8:21                      | Yes             |
| 09             | 4.00             | Energy                    | Heat pipes for server racks in data centers                       | 22:27                     | 10:25                     | No <sup>4</sup> |
| 10             | 4.25             | Water & Food              | Produced water filtering and cleaning                             | 21:57                     | --                        | Yes             |
| 11             | 4.50             | Misc services             | Software to capture employee feedback on hiring candidates        | 12:09                     | 17:00                     | No              |

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<sup>4</sup> This team was in a technology incubator and had initially been in I-CORPS Go, but dropped out. The program director remarked: “I’m not sure how much incremental value SEAL provided versus ATI, but they’re going to go through Cleantech Open. They were looking for that value” (Director 1).

**Table 3.** Program leads.

| <b>Participant</b> | <b>Title</b>                                       | <b>Interview Length</b> |
|--------------------|--|-------------------------|
| Director 1         | Director, SEAL 2018                                | 23:26                   |
| Director 2         | Director, Circular Economy and Materials Portfolio | 50:00                   |
| Director 3         | Director, Biosciences Portfolio                    | 24:19                   |