# Articulating Problems and Markets: A Translation Analysis of Entrepreneurs' Emergent Value Propositions

Clay Spinuzzi, David Altounian, Gregory Pogue, Robert Cochran, and Lily Zhu

*Written Communication*

First Published July 18, 2018
https://doi.org/10.1177/0741088318786235

## Abstract

In this qualitative study, the authors apply Callon's sociology of translation to examine how new technology entrepreneurs enact material arguments that involve the first two moments of translation—problematization (defining a market problem) and interessement (defining a market and the firm's relationship to it) - which in turn are represented in a claim, the value proposition. That emergent claim can then be represented and further changed during pitches. If accepted, it can then lead to the second two moments of translation: enrollment and mobilization. Drawing on written materials, observations, and interviews, we trace how these value propositions were iterated along three paths to better problematize and interesse, articulating a problem and market on which a business could plausibly be built. We conclude by discussing implications for understanding value propositions in entrepreneurship and, more broadly, using the sociology of translation to analyze emergent, material, consequential arguments.

The study is based on data collected at the Austin Technology Incubator's Student Entrepreneur Acceleration and Launch program (ATI SEAL) at The University of Texas at Austin.

**Keywords:** entrepreneurship, value proposition, problematization, interessement



Clay Spinuzzi
Department of Rhetoric and Writing
The University of Texas at Austin
clay.spinuzzi@utexas.edu

# Articulating problems and markets: A translation analysis of entrepreneurs' emergent value propositions


## Abstract

In this qualitative study, the authors apply Callon's sociology of translation to examine how new technology entrepreneurs enact material arguments that involve the first two moments of translation—problematization (defining a market problem) and interessement (defining a market and the firm's relationship to it)—which in turn are represented in a claim, the value proposition. That emergent claim can then be represented and further changed during pitches. If accepted, it can then lead to the second two moments of translation: enrollment and mobilization. Drawing on written materials, observations, and interviews, we trace how these value propositions were iterated along three paths to better problematize and interesse, articulating a problem and market on which a business could plausibly be built. We conclude by discussing implications for understanding value propositions in entrepreneurship and, more broadly, using the sociology of translation to analyze emergent, material, consequential arguments.

# Introduction

In early summer 2017, the founder of a new firm (we'll call it W1) stepped on stage to present his 12-minute business pitch. This pitch would be the beginning of his firm's participation in the Student Entrepreneurship Acceleration and Launch (SEAL) program, a 10-week summer program meant to mentor student-led firms as they explored the possibility of launching their technology-centered businesses. Today was SEAL's kickoff event: each of the 17 firms had to pitch their businesses to each other and to a room full of experienced mentors. After each pitch, the mentors were surveyed and the results aggregated for the firms to review later.

W1's pitch was straightforward. Invasive species—specifically zebra mussels and quagga mussels—had begun appearing in Texas lakes. Once established in a lake, these mollusks would crowd out other aquatic wildlife. Worse, they could also ruin the water purification equipment that allowed local towns to use these lakes as water supplies. But current methods of detecting these mollusks were unreliable, and current methods of eradicating them were both expensive and damaging to the environment. W1 offered a new, far less expensive and more reliable way to provide early detection. At a later stage, W1 also planned to develop a less expensive and less ecologically damaging way to eradicate the invasive species.

Yet mentors rated W1's investment potential as relatively low: a 3.5 out of 5. In their comments, they said that W1 was "Addressing important problem" with a "clear need, application," but W1 needed to provide "more on pich [sic], biz details"; they asked, "What is it going to take to get this done?" Of the 11 surveyed mentors, 7 agreed that W1 needed to work on market validation or market segment/size. In other words, they agreed that although W1 had identified a *problem*, it had not identified a *market*: specific actors (such as lake authorities or state agencies) who would spend money to solve it. And money is important: for a problem to be solved by a business (as opposed to another configuration such as a public agency), that business must sustain itself via a reliable revenue stream.

Like W1, other firms had trouble convincingly articulating their problem, market, or both. For instance, I1 proposed a software layer that would integrate Amazon Echo units into international hotels, automating concierge requests in a variety of languages; mentors generally agreed that the problem was underdefined and the market was untested. T1 proposed a practical levitation technology, comparing it to the famous hoverboard from *Back to the Future II*; one mentor wrote that "this is a tech[nology] right now" and another wrote that T1 had to "figure out the application + market potential." That is, these two innovators had produced a technology, but had not connected it with a business solution or a market solution. Without identifying a problem and market, these firms could not formulate the *value proposition*: the central claim that identifies how a firm can bring specific value to specific stakeholders, a claim that goes on to materially impact every aspect of the firm, from advertising and marketing to organization to R&D efforts to hiring strategy.

The processes of developing the problem and market—or, as they are commonly called in studies anchored in actor-network theory, *problematization* and *interessement* (Callon 1986; Swarts 2016)—are critical processes for a firm attempting to build a sustainable business. Problematization involves establishing whether a problem exists and whether it is painful enough to shift or disrupt an assemblage of material relations. Interessement involves establishing, out of a universe of potential actors, which ones are relevant to the problem; defining and characterizing them; extracting their agreement that the problem is pressing; and providing an

acceptable path to addressing the problem, a path that runs through the obligatory passage point (Callon 1986, p.196) of the firm. Problematization and interessement are reciprocal processes, leading to the formulation of the value proposition: a succinct claim that provides a stabilized representation of the results of problematization and interessement, i.e., the problem-market relationship. The value proposition then becomes the heart of a pitch, in which the actors can be *enrolled*, and post-pitch activities, in which they are *mobilized*. Together, these four moments—problematization, interessement, enrollment, and mobilization—comprise *translation*, in which an alliance, "a constraining network of relationships," develops as a sustainable compromise among the interests of the different actors (Callon 1986, p.79).

In this qualitative case study, we specifically focus on the first two moments of translation—problematization and interessement—and examine how they result in a transformed value proposition that is ideally stable enough to support a venture. How would W1 and others attempt to problematize the world so that their technologies could be positioned as solutions, then interesse (i.e., create interessement with) market actors who needed those solutions, and would these changes result in transforming their value propositions?

# Background

Before turning to the study, we overview relevant literature on translation and on value propositions.

## Translation

In its attempts to develop a problem and define stakeholders, W1 might remind us of another case involving mollusks: the famous case of St. Brieuc Bay that Michel Callon (1986) describes. In that case, marine researchers, fishermen, and scallops formed an uneasy, mutually beneficial, materially instantiated alliance. The researchers wanted to study scallops to determine how to best preserve them in the long term; the fishermen wanted to ensure their long-term livelihood; and the scallops presumably wanted to live undisturbed. The researchers coordinated an alliance in which they deployed larvae collectors into which the scallops could settle to be studied in safety, while the fishermen fished elsewhere. That alliance held until Christmas Eve when it suddenly collapsed: Scallops fetched high prices on Christmas Eve as people demanded them for the Reveillon feast, so the fishermen decided to follow their short-term, individual interests and betray the alliance by raiding the larvae collectors.

Translation is a materialist frame that others in writing studies have used for understanding emergent arguments in complex cross-specialty domains such as disaster communication (Potts 2009), distributed communication supported by digital technologies (McNely 2009; Swarts 2010, 2011, 2016), an interdisciplinary university research lab (Read & Swarts 2015), and search engine marketing (Spinuzzi 2010). It is often used to discuss how actors persuade each other, forming an alliance (a durable network of relations) on which further agreement and actions can be built. It has also been used more broadly in studies of science and technology (Latour 1996, 2006), including entrepreneurship (Akrich, Callon, & Latour 2002a, b). Here, we use it to

examine how early-stage entrepreneurs like W1 attempt to formulate emergent, material, consequential arguments about problems and markets, represented in value propositions. Although a successful venture will eventually use all four moments of translation, SEAL focuses primarily on the first two. That is, problematization and interessement must be done to produce a *value proposition* that can be successfully used in a pitch—a pitch that, if successful, enrolls stakeholders and leads to mobilization. See Table 1.

Table 1. Moments of translation and their relationships to entrepreneur activities.

| **Moment of translation (quotes from Swarts 2011, p.278)** | **Relation to entrepreneur activities** |
|---|---|
| *Problematization*: "reshaping and stating a problem or activity in terms specific to a particular discourse." Here, the innovator articulates a problem for a market. | Pre-pitch activities: technology development; customer discovery and validation; business model development. |
| *Interessement*: "relating an actor's interests with another set of interests." Here, the innovator articulates a market that faces a problem. | Pre-pitch activities: technology development; customer discovery and validation; business model development. |
| (The *value proposition* represents a stable problem-market or problematization-interessement relationship, presenting a solution and its benefits) | Pitches and pitch decks |
| *Enrollment*: "coordination of actors with related interests." Here, the innovator proposes an alliance. | Post-pitch question-and-answer session (Q&A) and sales activities. "To describe enrollment is thus to describe the group of multilateral negotiations, trials of strength, and tricks that accompany the *interessements* and enable them to succeed." (Callon 1986, p.74) |
| *Mobilization*: "consolidation of interests of the group through the representation of a spokesperson." Here, the alliance is realized through contracts, agreements, and sales. | Post-pitch agreements. |

## Value propositions

The term "value proposition" is fairly recent, having been coined in the 1980s (Lanning & Michaels 1988). By 1991, Geoffrey Moore provided a formulaic two-sentence template for value propositions (or "positioning statements"), identifying target customers, a specific problem they

face, the new product category being offered, a key benefit that solves the problem, and advantages over competitors (1991).

More recently, value propositions have been understood not just as proposing exchange value but also as inviting dialogue about use value (Kowalkowski 2011); in such dialogues, they are seen as "reciprocal promises of value, operating to and from suppliers and customers seeking an equitable exchange" (Ballantyne and Varey 2006, pp. 334-335; cf. Ballantyne et al. 2011). Early in the process of formulating a value proposition, the focus is on developing "a shared interpretation [between provider and customer], from which the essence of a reciprocal value proposition can emerge" (Kowalkowski 2011, p.286). Lusch & Webster (2011) similarly define a value proposition as "an invitation [to potential buyers and resource-provider partners] to participate in the process of cocreating value that is superior to competitor offerings" (p.132). Yet, as Skalen et al. (2014) point out, "the value proposition concept ... remains poorly defined" (p.137). Kowalkowski et al. (2012) similarly argue that "there is a growing need for studies that address the activities through which value propositions are formed, and how the idiosyncratic goals, experiential knowledge, and context of resource-integrating actors influence this formation" (p.1555).

Marketing scholars such as Skalen et al. (2014) and Kowalkowski et al. (2012) have turned to practice theory to articulate the value proposition as a reciprocal achievement among actors. But we turn instead to the sociology of translation. For our purposes—understanding emergent, material, consequential arguments—the sociology of translation has advantages over practice theory. First, it allows us to analyze value propositions as arguments that audiences evaluate, resist, co-iterate, and can be convinced by. Second, it emphasizes material interactions and resistance, whereas practice theory tends to describe intangibles such as knowledge, needs, rules, principles, and norms. Third, it has been used and developed in rhetoric and writing studies, providing better integration with the concerns of this field, both in the rhetoric of entrepreneurship (e.g., Belinsky & Gogan 2016; Galbraith et al. 2014; Lucas et al. 2016) and in the field as a whole.

As illustrated in the previous section, within the sociology of translation, value propositions can be understood as attempts to stabilize the results of problematization and interessement (i.e., problem and market) in order to solidify a new alliance around which stakeholders can be enrolled and mobilized. These value propositions are emergent, material, consequential arguments.

For instance, W1's value proposition is *emergent*: out of the many possibilities, W1 is attempting to identify both an agreed-upon problem and the specific stakeholders that can be interested in allying with W1 to solve it. This emergence is ontological, since market segments are not existing categories, but rather attempts to define new categories of stakeholders in relation to a problem that is itself emergent and interdefined. The argument is *material*: it can be resisted not just by the customers but also by nonhuman actors such as the invasive species (i.e., W1's technology has to detect and eradicate them to be convincing). And the argument has material *consequences*, not just for sales but also for the nascent firm's research and development efforts, business model, marketing strategy, and hiring strategy. That is, the value proposition is not an advertising, marketing, or branding gambit meant to describe an existing product. Nor is it an abstract statement with weak connections to concrete decisions, as vision and mission statements sometimes are. Rather, the value proposition, once accepted, becomes inscribed in contracts, organization, business model, research and development (R&D), and a number of other ways; it provides the underlying agreement on which the venture is founded. If the assemblage resists—

for instance, if W1's technology were to fail to reliably detect zebra mussels—the value proposition must be reformulated or abandoned.

Value propositions are in flux as a firm attempts problematization and interessement—especially in early-stage technology commercialization, in which the technology is fluid and markets have not yet been well defined. That is, they must be iterated. In our previous work, we have found that entrepreneurs iterate value propositions along at least four dimensions: argument, application, design, and financial model (London, Pogue, & Spinuzzi 2015; Pogue, Bravo & Tran 2016; Spinuzzi, Jakobs, & Pogue 2016; Spinuzzi et al. 2015). Here, we call this model the AADF model (Table 2). Each of these transformations is rhetorical in the sense that they change the speculative claim of a value proposition, representing different potential problems and potential stakeholders to whom a problem might be compelling. Through these rhetorical moves, entrepreneurs attempt to identify plausible product-market configurations that could be stable enough to serve as a value proposition.

**Table 2**. The AADF model, characterizing four rhetorical transformations of value propositions.

| **Dimension** | **Question** | **Definition** | **Example** |
|---|---|---|---|
| Argument | *Why* does this innovation bring value? | Changes resulting in a more persuasive *argument* for the defined stakeholders about the defined problem and the innovation's ability to address it. | A coated brake spring's initial value proposition is noise reduction; the final value proposition is greater safety through corrosion resistance. (London, Pogue, & Spinuzzi 2015) |
| Application | To *What* should this innovation be applied in order to bring value? | Changes to the *application* that the technology can solve, such as a new problem or target market. | Software for reducing ambient noise: originally applied to mobile phones, later applied to drive-through PA system. (London, Pogue, & Spinuzzi 2015) |
| Design | *How* should this innovation be changed in order to bring value? | Changes to the *technology's design* to strengthen its claim to address a problem for a set of stakeholders. | A platform initially delivers virtual medical case presentations via interactive training and student assessment; it is redesigned to engage students in medical problem-solving through gamification and case studies relevant to a partner organization. (Pogue, Bravo & Tran 2016) |
| Financial model | To *Whom* can this innovation | Changes to the *stakeholders* | Initial value proposition offered hospital *patients* reminders and |

| | | | |
|---|---|---|---|
| | bring value? | benefited by the claim, usually by creating a new financial flow or finding alternate funding sources. | tracking of medical adherence to increase personal health; final value proposition offered *hospitals* a tool to reduce up to 60% of re-admissions during the first 30-days post discharge. (Pogue, Bravo & Tran 2016) |

In this study, we applied the AADF model to identify how participants iterated their value propositions in their problematization and interessement attempts.

# Methodology

We posed the research question: How would entrepreneurs attempt to problematize the world so that their technologies could be positioned as solutions, then interesse market actors who needed those solutions, and would these changes result in transforming their value propositions? To answer this question, we designed an exploratory, qualitative case study, using conventional qualitative methods for collecting and analyzing data (Miles, Huberman & Saldana 2014; Propen & Schuster 2010; Saldana 2013) that have been used in other studies of writing based in actor-network theory (e.g., Spinuzzi 2010; Swarts 2016; Teston 2017). Below, we discuss the entrepreneurship training program and how we selected participants, as well as our data collection, reduction, and analysis procedures.

## The program and participants

The Austin Technology Incubator's Student Entrepreneur Acceleration and Launch (ATI SEAL) program is a nine-week summer program designed to help student firms identify and address threats to their new ventures. In SEAL, firms examine market interest, technology fit and function, and ultimately the ability to create and support a differentiated value proposition that can support successful commercialization. SEAL provides a mentor-driven approach to assist student-led enterprises. In SEAL, firms

1. Identify key challenges that stand between their vision and market success;
2. Test business and technology claims in the marketplace;
3. Define their value propositions; and
4. Communicate their decision to launch ("Go"), stop development ("No go"), or change strategy ("Pivot").

SEAL provides both structured and unstructured opportunities for firms to develop, including the following:
**Kickoff pitches**: At the beginning of SEAL, firms deliver their existing, 12-minute pre-SEAL pitches.
**Lunch and learns**: Five 2.5-hour catered events in which guest speakers from the Austin technology community discussed entrepreneurship-related topics.
**Workshops**: Three 2-hour workshops in which guest speakers from the Austin technology community assisted with specific firm development needs.

**Mentorship**: Unstructured meetings with 2-5 assigned mentors familiar with the sector in which each firm intends to compete (e.g., healthcare, Internet, water technology, transportation).
**Decision Day pitches**: At the end of SEAL, firms deliver their final, 5-minute pitches, including their decision about whether to launch, stop development, or pivot.
The SEAL program has been in operation since 2009. In 2017, SEAL had 17 firms. After their kickoff pitches, we received mentors' rankings and individual feedback for firms in the form of Business Pitch Presentation Feedback Forms (BPPFFs). In these forms, up to 18 mentors individually rated each firm on a 1-5 scale for multiple criteria, including "Investment Potential: The business represents a real investment opportunity." This criterion functioned as an overall summary of the mentor's impressions: it represented a judgment based on all of the previous criteria.
To select our sample for this study, we took the average of the mentors' scores for Investment Potential for each of the 17 firms. We then sorted the firms based on their average Investment Potential scores and selected every other firm, for a total of 8 firms (47%) in our sample. We then approached firms. If a firm said no to interviews, we went to an adjacent firm on the ranked list (i.e., ranked either the next higher or the next lower). Two firms said no, and a third did not respond. Table 3 shows the participating firms.

This strategy yielded a sample with a range of readiness; a range of industries; firms approaching different markets; and firms with different categories of innovations (healthcare, information technology, transportation, water technology).

**Table 3**. Teams participating in the study (ordered by Investment Potential score).

| **Firm ID** | **Investment Potential score (out of 5)** | **Business type** | **Short description** | **Degree being earned (or recently earned) by lead innovator** |
|---|---|---|---|---|
| I1 | 2.66 | Information Technology | A voice recognition platform for improving the hotel experience. | Bachelor's |
| H1 | 3.07 | Healthcare | A simplified, mobile-first electronic medical records system targeted to developing markets. | MD |
| W1 | 3.09 | Water Technology | Molecular solutions for detecting and mitigating invasive species in lakes. | Ph.D. |
| I2 | 3.13 | Information Technology | A personal relationship manager app. | Bachelor's |
| W2 | 3.5 | Water Technology | A device for reducing water waste during shower warm-up. The device would be marketed to hotels and would | Bachelor's |

| | | | | |
|---|---|---|---|---|
| | | | also offer water analytics. | |
| T1 | 3.64 | Transportation | Practical levitation technology. | Master's |
| I3 | 3.77 | Information Technology | A distributed market for renting personal parking spaces during events; Airbnb for parking spaces. | Bachelor's |
| H2 | 4.21 | Healthcare | An instrument allowing scientists and technicians to accurately identify the proteome (the complete protein composition) of their samples. | Ph.D. |

## Data collection

Data collection involved the following methods for answering the research questions:

*Artifacts*

**Pitch decks**. We collected initial and final pitch decks for each firm's pitch as well as near-final decks from two firms that chose to provide them.

*Surveys*

**Business Pitch Presentation Feedback Form (BPPFFs)**. SEAL surveyed program mentors for their evaluations after each kickoff pitch. These surveys were forms with Likert scales; mentors circled the appropriate choice on the Likert scale for each characteristic of the pitch and optionally annotated the forms. The research team collected 238 responses, of which 108 responded to the firms in our sample. Researchers keyed the results into a spreadsheet, then moved the data into a SQL database.

*Observations*

**Videorecorded pitches**. For all firms, SEAL videorecorded 15-minute pitches at kickoff (at the beginning of the program) and 5-minute pitches on Demo Day (at the end of the program).
**Structured training**. SEAL provided two types of structured training during the program: five 2.5-hour "Lunch and Learns" and three 2-hour workshops. These training sessions were attended by the first author, who took observational notes, and were videorecorded.

*Interviews*

**Semistructured initial interviews with selected 2017 SEAL program firm leads**. During the first two weeks of the program, the first author conducted initial interviews with representatives of each selected firm, focusing on the firm's current pitch and value proposition. Interviews took 9-26 minutes. (See Table 4.)

**Semistructured final interviews with selected 2017 SEAL program firm leads**. During the last week before Decision Day, the first author conducted final interviews with representatives of each selected firm, focusing on how the firm evolved the pitch and value proposition over time. Interviews took 9-25 minutes. (See Table 4.)

**Semistructured interviews with selected 2017 SEAL program mentors**. After interviewing firm leads, the first author conducted interviews with three mentors who mentored those firms. Interviews focused on how each firm evolved the pitch and value proposition over time. Interviews took 15-21 minutes. (See Table 4.)

**Table 4**. Interviews with firms, firm pitches, interviews with mentors. (Length in minutes)

| **Firm ID** | **Initial interview** | **Final interview** |
|---|---|---|
| I1 | 26:52 | 25:01 |
| I2 | 17:11 | 14:06 |
| I3 | 13:30 | 15:21 |
| H1 | 13:18 | 10:31 |
| H2 | 20:20 | 20:41 |
| T1 | 9:34 | 9:23 |
| W1 | 19:02 | 14:50 |
| W2 | 20:46 | 24:22 |

| **Mentor ID** | **Firms mentored** | **Final interview** |
|---|---|---|
| 13 | H1, I2, I3 | 14:55 |
| 20 | H2, I1, I3, T1 | 21:09 |
| 26 | W1, W2 | 17:43 |

## Data reduction

As noted, we selected eight of the 17 participating firms to examine (Table 3), representing a mix of investment potential as assessed by mentors. We reduced data further by coding data and investigating specific themes (below).

## Data 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 mentors. (We chose not to code videorecorded pitches because our review of the videos suggested that the oral pitches were redundant with the interviews and pitch decks.) Coding was non-exclusive. Authors 2 and 3 coded entries under Author 1's direction, initially using descriptive starter codes (Miles, Huberman, & Saldana 2014) based on central concerns implied within our theoretical frame, such as the identified problem and solution; value proposition development; and the degree to which a value proposition had been described or proposed. Once starter codes were applied, Authors 2 and 3 performed open coding (Corbin & Strauss, 2008) to inductively identify recurrent themes related to problematization, interessement, and value proposition statements and transformations. Appendix A shows selected codes.

Once we identified themes in codes, we used other datasets to confirm and illustrate them, examining how firms transformed their value propositions between pitch decks.

### *Triangulating*

We also triangulated datasets, comparing interview statements with each other and with other data. Specifically, we triangulated along these lines:

**The initial value proposition**. We compared firms' initial interview statements about their value propositions with their initial (kickoff) pitch decks.

**The initial understanding of their challenges**. We compared firms' initial interview statements about their challenges with the kickoff mentor forms.

**Changes in the value proposition**. We compared firms' initial and final interview statements about their value propositions; we compared their initial (kickoff) and final (Decision Day) pitch decks; we compared the results with their mentors' interviews.

**Outcome**. We compared the firms' changes in their value proposition to their Decision Day outcome (Go, No Go, or Pivot) and rationale.

# Findings and Analysis

Firms in this sample worked in four broad domains: water technology, information technology, health sciences, and transportation (Table 3). As is often the case in entrepreneurship education programs, firms varied widely in their innovations and backgrounds. Specifically, they ranged in their basic relationships with their technologies. On one end of the continuum, firms began with an existing, relatively stable technology, then sought problems that the technology could solve ("technology-first" firms, which observe trends). On the other end, firms started by identifying a specific problem, then sought to develop a technology to solve it ("problem-first" firms, which find gaps).

The two *technology-first firms* (T1, H2) were built on technologies developed by advanced degree holders within university research. Thus these technologies were relatively stable, but the firms were new to considering business applications and problems. For instance, T1's founder had developed his technology for his Master's thesis in engineering, and decided to develop a business around it just a week before SEAL began. Since these firms tended to be formed around technology developed in long-term funded research programs, their main challenge was to find a problem that could be solved by the existing technology, in which they had invested considerable energy, time, and resources. These technologies were grounded in deep technical expertise: few had the expertise to develop such technologies.

Three of the four *problem-first firms* (I1, I2, I3) were all built by undergraduates; the fourth, H1, was founded by an MD. These firms tended to identify a problem first, then use readily available technology to address the problem through an emergent innovation. For instance, I1 thought of the business idea (a voice recognition platform for improving the hotel experience) six months before SEAL and began developing software to implement that vision. For these firms, the main challenge was to quickly develop technology that could address the problem; they had little investment in the technology itself, which could be conceivably developed by anyone with the requisite app development skills. Notably, all of these firms developed software products, which were comparatively easy to develop and iterate in comparison to the solutions of the technology-first firms. Since the technologies built by the problem-first firms were easy to iterate, the firms themselves could pivot more easily.

Somewhere in the middle were the two *water technology firms*, including W1 and W2. Both applied familiar, malleable technology to an unfamiliar domain. For instance, the founder of W1, a Ph.D.-holding biologist specializing in cancer research, had heard about the problem of invasive species in Texas lakes and applied ideas from "early diagnostics for early-stage cancers" to the new domain. For these two water tech firms, the challenge was to synchronize a malleable technology with a problem in an unfamiliar domain.

In the analysis below, we follow these firms through the SEAL process: their pre-SEAL state, their kickoff pitches, their progress through the SEAL program, and their Demo Day pitches (Figure 1).

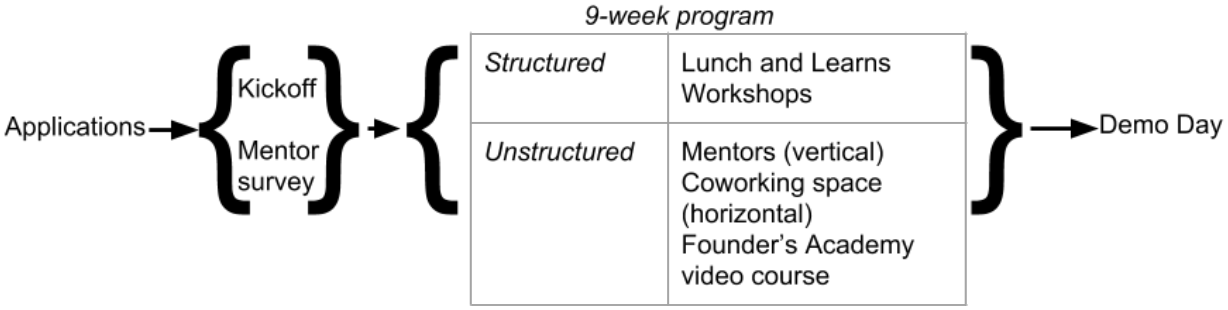


Figure 1. SEAL components.

## Pre-SEAL

Firms applied for SEAL based on an innovation, and (as we'll see below) they had to present a pitch deck on their first day. Thus every firm had done considerable preparatory work before SEAL began. W1's founder, for instance, discussed how he had first discovered the problem of invasive species in lakes:

> I had the original idea for it about four years ago... . It was actually over Christmas, and my dad and my best friend were both kvetching about zebra mussels to some extent or another, but from different angles. I was the biologist in the room and I didn't know what a zebra mussel was, which was very unfortunate. (W1 interview 1)

He began researching the problem and realized that it could be solved by applying solutions that had been developed in his own line of work: "Early diagnostics for early-stage cancers. The idea, of course, being prevention is cure. That was something that could be plugged and played into a early detection and monitoring system at a much lower cost and drive revenue." About a year before SEAL, he launched the company and "Since then we've been trying to ramp up and get the word out and all that." During that time, he joined a local bioscience incubator—a common move for young firms, since an incubator can provide mentoring, coaching, networking, and access to capital (Soetanto & Jack 2016, p.25). Mentoring came in the form of a venture capitalist (VC), who advised W1 to develop a pitch deck that focused on the problem, solution, and firm (W1 interview 1).

At this point, W1 had represented the *problem* as primarily early detection and prevention: "early detection prevention costs about one-tenth of the cost of annual maintenance. If you can prevent, for even a year, you've saved 90 percent of your money for that year." Eradication, although possible, would involve far more expense. The market was vague, starting with "my dad and my best friend" and expanding to "fisheries and recreation," lake authorities, and "US Fish and Wildlife and Bureau of Reclamation and others."

As a student entrepreneurship program, SEAL might be expected to attract innovators with roughly the same level of experience, yet the innovators varied in entrepreneurship experience. Like W1, all of the interviewees had prior entrepreneurship education and/or mentorship experience: they either received entrepreneurship training, worked with mentors, or worked in an accelerator or incubator (see Table 5). But this experience varied widely. For instance, I3 studied

entrepreneurial management in college and was mentored by an investment group made up of alumni of that college. I1, I2, and T1 all participated in the same accelerator at their university. W1 was in a bioscience incubator attached to a community college, while W2 had "16 advisors/mentors" and was simultaneously participating in "four different incubators" (including SEAL). One interviewee had taken business classes and was simultaneously working with another summer accelerator program at another university (H1). One firm (H2) had gone through the SEAL program two years earlier; at that earlier stage, the firm had decided to defer developing the business until they had developed their technology further. Between their two times in the SEAL program, they participated in an NSF I-Corps program and in two competitions.

## Kickoff

During the kickoff event, each firm had 12 minutes to present their initial pitch. These pitches served as a baseline for SEAL mentors, experienced entrepreneurs in different industries. These mentors listened to each pitch, engaged in a short question-and-answer (Q&A) period, then rated each pitch. Later, mentors would be paired with appropriate firms throughout the rest of the program.

W1 presented last (17th) at the kickoff event. Guided by an advisor from a venture capital firm, W1's deck had two slides describing the problem of these two invasive species, then four slides detailing the qualifications of the three firm members, then three slides on their solutions. "Solutions: Early Detection" emphasized novelty, flexibility, and cost; "Solutions: Equipment" emphasized automation and data quality; and "Solutions: Eradication" described a proposed immunotoxin eradication solution that could be "Bioengineered to ONLY impact the target species" while being "Highly efficient and economical."

During the Q&A, one mentor asked: What's the actual technology? W1 explained that two were involved. For early detection and monitoring, W1 offered an automated early detection platform based on a proprietary algorithm. For eradication, W1 proposed using a chimeric protein. In response to another mentor, W1 asserted that zebra and quahog mussels were just the "low hanging fruit," and W1 could apply the same strategy to addressing other invasive species such as Asian carp and invasive plants. That is, W1 planned to start in a beachhead market, then expand to adjacent markets (Moore 1991).

As we saw at the beginning of the article, mentors rated W1's investment potential as relatively low (3.5 of 5). Although they agreed that W1 had identified an important problem, 7 of the 11 agreed that W1 needed to work on market validation or market segment/size. Although W1 had identified a *problem*, it had not identified a *market*: specific actors (such as lake authorities or specific state agencies) who would pay to solve it. Indeed, W1's problem slides had only mentioned vague actors, and only in the context of displaying news headlines: "Montana"; "Oregon legislators"; "Officials"; "State Agencies." Two weeks after the kickoff pitch, W1's founder told us that "It's an immediate problem that needs to be solved." Here, the italicized words represent interessement opportunities for various markets:

> [Invasive mollusks] grow in such density on top of each other, that they can clog *pipes,* break pipes...anything you put in the water ends up getting covered in these things to the point where they are unusable. *Buoys, shipping systems*, *water treatment facilities*, *water transport facilities*. *Power plants* that use the lake as a cooling source and on from there.

> All have to essentially shut down to treat whenever they have to treat. The screens and the other things that they put up to try and prevent them doing critical damage to the entire system are expensive and have to be replaced constantly. (W1 first interview)

Yet, even two weeks after the kickoff pitch, these market actors were still vaguely defined. For whom was this problem a problem, and could they provide the revenue stream necessary to sustain a business around this technology? Not surprisingly, W1 received low marks for target market (3), market size (2.9), understanding of competitors (2.4), sales analysis (1.4), and revenue model (1.3). W1's founder reviewed this feedback and said that "a lot of it was spot on… I had cut all of that out of the pitch deck. On [his VC mentor's] advice, but whatever, it was my call."

This kickoff deck summarized the value proposition in the three Solutions slides: the novelty, flexibility, and low cost of detection, the automation and data quality of monitoring, and the specificity and low cost of eradication. When we asked W1 to orally summarize the initial value proposition, he emphasized the low costs of early detection and the severity of this "immediate problem that needs to be solved." Importantly, this early attempt at a value proposition provided a vague problem and no representation of the market.

Others had difficulty as well. For instance, T1, whose idea for a business was only a week old at kickoff, got high marks for his technology and problem, but low marks for market, competitors, revenue model, and expenses: as one mentor said, "this is a tech[nology] right now" without a defined market or application. T1 did not even express a value proposition in its deck. Nevertheless, on the strength of its levitation technology, T1 scored higher in investment potential than W1. In contrast, I1, whose business idea was three months old, received the lowest investment potential score in our sample due to low marks on problem, market, and competitors, among others. One mentor bluntly asked: "what problem are you solving? for hotels? for hotel patrons? for hardware manu[facturers]?"

At the kickoff stage, then, W1 and the other firms generally struggled to provide an adequate value proposition that represented a problem-market relationship well enough to serve as the foundation for a business.

## SEAL

After the kickoff pitches, W1 and the other firms began SEAL activities (Figure 1). These activities included structured programming: three 2-hour workshops and five 2.5-hour "Lunch and Learns" in which experienced local entrepreneurs covered specific aspects of entrepreneurship. They also included unstructured interactions with mentors and with other firms in the provided coworking space, as well as an optional video course. Through mentors, firms could also pursue customer discovery and validation (i.e., pitching the innovation to potential customers to gain their feedback) and sales. That is, these activities provided opportunities for firms to further articulate problem and market and to iterate their value propositions.

The second Lunch and Learn, on Market Sizing and Validation, was pivotal for W1. In this session, the SEAL director spoke briefly before the guest speaker, and he used an analogy that has been used in entrepreneurship since at least the 1970s: A *vitamin* is good for long-term well being, but an *aspirin* relieves immediate pain. The SEAL director emphasized that although buyers might know they needed a vitamin, they were more likely to buy an aspirin: "If you ever

had a migraine, you'd pay about anything to get it solved." W1 realized that its prospective customers might know that they *should* take the preventative measures of early detection and monitoring, measures that could save them 90% of their potential expenses. But they would likely wait to spend money until they felt the pain of the unsolved problem—that is, until they had to eradicate an infestation. In a later conversation, the SEAL director pointed out to W1 that even if he could convince lake authorities to spend proactively, other stakeholders in their organizations may not allow it until they faced an actual, verified problem (an infestation). This is in fact how W1's potential customers operated.

Based on this discussion, by the end of SEAL, W1 orally described its revised value proposition as "eradication" of the invasive species. "It's not just early detection and monitoring. It's, 'This is how we can actually solve your problems.' That's a lot more persuasive than the early detection modeling that we were doing previously." W1 had begun "working on this pitch for Texas Water Development Board," a specific agency, and had also been involved in conversations with a local lake authority.

When W1 decided to treat the innovation as an "aspirin" rather than a "vitamin," the changes were material: W1 shifted its technology development efforts, identified specific decision-makers (audiences), began thinking about how to support *those* decision-makers' internal arguments with *their* stakeholders, and changed its business plan. W1 also started closely monitoring rainfall in the region, since lake levels would affect how quickly decision-makers would need to make decisions. W1 was able to define significant human and nonhuman actors in relation to a mutually interdefined problem and to invite them to define each other in turn. The value proposition was developed to represent this stabilized relationship.

Like W1, many of the other firms found the Market Sizing and Validation Lunch and Learn to be pivotal. For instance, after this Lunch and Learn, I1 began focusing on customer discovery, which became "the most valuable part of the summer":

> because I actually ... stood outside and actually talk[ed] to people and I was like, "What do you think about this? Would you stay in a hotel that had this? Would you use this? Do you like this?" ... I ran a couple of focus groups—a group of people that were just the public— and then I talked to some people on the Internet running a survey through social media. I also talked to hotel managers. I reached out and got a pretty low response rate from the managers but very important information. I spent my time doing customer discovery outside of the structured portion of the SEAL program. (I1 interview 2)

One mentor praised I1 for this shift: "[I1] is a prototypical entrepreneur. ... His journey through SEAL has been essentially finding out that his approach was wrong. Like he's got the wrong market to deploy his technology and he's been real good about seeing that as an opportunity as opposed to a failure. ... that's where I think you separate entrepreneurs from inventors" (M2).

T1 similarly found the structured and unstructured programming to be useful:

> It has helped us, especially through the mentors, to see more of what an investor would want to see as opposed to what an engineer would want to see. When I started this, I was purely focused on the technology and the physics behind it, [technology] validation and all those things. All the financials, business, value prop, all that was [secondary]. That should be put as a first priority, especially when you're asking for money. (T1 interview 2)

As they articulated their problems and markets differently, the firms began to iterate their value propositions. Although all firms iterated their value propositions, they iterated in different ways, including changing the *argument*, *application*, and *financial model* (see Table 2). To understand these iterations, below, we group the firms based by their orientations to their technologies, then discuss their iterations in detail. Here, we draw on our interviews with firms near the end of SEAL, shortly before Demo Day.

*Technology-first firms*

As noted earlier, the two technology-first firms (T1, H2) were built around a technology that they had developed over a long period of time, leveraging their specific technical expertise, in academic environments. Thus we were not surprised to find that these two firms did not iterate the *design* of their technologies.

T1 iterated its value proposition insofar as they had not offered a specific value proposition in their initial deck; in the interview, they proposed building their hover technology into both consumer and industrial products, identifying advantages for each application. Although T1 characterized this iteration as a change in *financial model*, we coded it as a change in *application*. However, this iteration did not target specific problems or markets.

H2 iterated both its *argument* and its *application*. Its plan was to offer services to pharmaceutical companies in the short term, giving the firm the time and investment to develop and sell products (instruments, consumables) in the long term. Yet, as mentor M2 noted, their value proposition did not identify specific market pain that was acute enough to motivate customers to immediately pay for a solution:

> [H2 is] a little bit ahead of the market. Two to five years, maybe 10 years ahead of the market in terms of their ambition and what their tech can do. It's a very common thing and being too early is the same thing as being wrong as far as an investor's concerned. ... They needed to hone in on, "Here's the market where we can get into immediately, prove our technology. It's decent enough sized that we can, with a modest investment, grow to a good size to where we're ready to raise significant, probably eight to nine figures of capital."

M2 added that to do this, H2 would need new "soft" (rhetorical) skills, and "that's a hard ask of someone to develop a bunch of soft skills when they are used to 'I'm rewarded for being the best at whatever in my field.'"

*Problem-first firms*

Surprisingly, the problem-first firms also did not iterate their products in terms of *design*. That is, although they may have made minor interface changes such as adding a screen or changing icons, their overall software designs did not change significantly. Rather, they changed *arguments*, *applications*, and *financial models* in their attempts to identify and relieve market pain.

I1, I3, and H1 all iterated their *arguments*. For instance, I1 had initially offered "data analysis" to hotels, but now expressed why hotels might need such a data analysis: "insight and truly providing a good experience for their customers, but insight into what those customers want." I3 had initially offered a list of features for his parking space marketplace; by the end of SEAL, he

summarized his service as "we eliminate ... the headache that goes along with parking" for people attempting to attend events. Finally, H1's initial value proposition described features rather than benefits: "Standardization of field data," "Integrated interfaces to reporting systems," and a "Software as a Service (SaaS) solutions model." Its final value proposition emphasized true benefits in relieving pain: as "a simplified EMR built for providers by providers" (a phrase that would also show up verbatim in H1's Demo Day deck).

I1 and I2 also iterated their *application*. For instance, I1 had initially tried to offer value to travelers; by the end of SEAL, I1 realized that he had to offer value specifically to the hotels, which would be his actual customers. Similarly, I3's initial value proposition listed services for "everyone"; its final value proposition narrowed the problem, focusing on non-sales executives who were nevertheless involved in the sales process, "helping you follow up and follow through with individuals. ... [the software tells] you who you need to reach out to, when to reach out to them, and even what to say. The second part is giving you that holistic overview of your network." By narrowing the application from "everyone else" to people in startups and other small businesses—who might not be salespeople but who feel the pain of being involved in ongoing sales efforts—I2 was able to make a more concrete argument for value.

Finally, I3 iterated the value proposition in terms of *financial model*. I3's original value proposition attempted to articulate value for both sides of a two-sided market (a market in which both the buyer and seller pay for a service; see Osterwalder et al. 2010). During the Market Sizing and Validation lunch-and-learn, I3 was advised that such markets were hard to build. This insight led I3 to shift its business model, selecting just one buyer and focusing on how to address a defined problem for that buyer.

*Water technology firms*

As mentioned, the two water technology firms were neither technology-first nor problem-first. These firms both iterated their value propositions as well.

W1, as we saw earlier, had begun by emphasizing the "vitamin" of early detection and prevention. After attending a workshop, W1 iterated its value proposition by emphasizing the "aspirin" of eradication. Detection and prevention were still services, but as W1 told us, they were "much more connected, like a vertical play. It makes a hell of a lot more sense than it did before." This new focus had led W1 to iterate based on *argument* (claiming a solution for infested lakes rather than threatened lakes), *application* (eradication-first, not detection- and prevention-first), and *financial model* (eradication meant that authorities could draw on different funds).

W2, on the other hand, had already iterated considerably before entering SEAL—in fact, the founder told us that the device had originally been developed for entirely different reasons, then had been redesigned with substantial feedback from potential customers. Perhaps for that reason, W2's value proposition had not changed dramatically during its participation in SEAL. But W2 had been able to iterate its *financial model*. As the founder told us during his second interview, they had identified two different hotel segments: "One is economy hotel segment and the other is there's a green hotel segment." The green hotel segment was a luxury segment, whose customers might be interested in the innovation for personal use. Thus W2 iterated the financial model to bring more financial value to those stakeholders: "Any consumer devices we sell through their hotel, they get a cut."

Notably, none of the firms chose to iterate their value propositions in terms of design. Even for a problem-first firm developing software, eight weeks is perhaps too short a time to iterate design productively. In any case, SEAL did not include workshops on co-iterating design with users (such as through Design Thinking).

## Demo Day

On Demo Day, each firm presented a brief version of its pitch deck. These pitch decks served a dual purpose: They encapsulated each firm's pitch, but they also explained what the firms had learned during SEAL and whether they had chosen to "Go" (launch a business based on the innovation) or "No Go" (decide not to launch). SEAL personnel emphasized that a "No Go" was just as important as a go, yet only one firm (outside our sample) chose an unambiguous "No Go." Other firms chose "Slow Go" (I1), "Phased Go" (H2), "Pivot/Go" (another firm outside our sample), or "Go" (all other firms).
Overall, firms' slides demonstrated newly formulated value propositions with more specific problems and markets. These value propositions often also reflected more specific implementations of technology to unite the problem and market. For instance, following its "aspirin" strategy, W1 first included a slide called "Partners" to demonstrate some of the many specific agencies that had already been interested: US Fish and Wildlife Service, Colorado Parks & Wildlife, Texas Parks & Wildlife, and eight more. W1 then included this slide to emphasize its main value proposition of targeted eradication (Table 5).

Table 5. Comparison of initial and final value propositions for I1, T1, and W1.

| Firm | Written value proposition from kickoff deck | Spoken value proposition (interview 1) | Written value proposition from Demo Day deck | Spoken value proposition (interview 2) | Iterations |
|---|---|---|---|---|---|
| I1 | "For travelers:<br>voice assistant "remote control" for your hotel room" (Slide 3)<br><br>"For hotels:<br>Communication<br>In-room Revenue<br>Data mining, Analytics" (Slide 4) | "My value proposition is to hotel saying, "You pay for this software service and you let people interact with this for free. What we're charging you for is the analysis of how people interact." The behavior interaction, providing you reports, visualization of that data, insight that we're pulling from that data. … the value proposition is in we're providing insight on data analysis." | "In-room voice assistants will create a better customer experience for travelers and increase hotel's daily RevPAR (revenue per available room)" (slide 2) | "a way to communicate and customize the experience.... insight and truly providing a good experience for their customers, but insight into what those customers want." | ARGUMENT APPLICATION |
| T1 | (No value proposition statement; the deck identifies potential markets and applications.) | "It would depend on the market we approach. For instance, we're in talks with Disney. Last week we got a meeting with one of them. We're waiting to hear back. Our value proposition to them would be that wow factor, especially to help with the emerging experience in Disney." | "A patent-pending air levitation design<br><br>Maglev heights at a fraction of the cost<br><br>30% cheaper build minus SURFACE COST!<br><br>Designed to levitate a train and make MagLev Irrelevant!" (slide 4) | "Consumer, we have a technology that is unlike anything else on the market. We don't need a special surface to hover, unlike magnets. We can hover more than 10,000 times higher than any other commercial air bearings. Then price point, there's not a single hoverboard. We are half as cheap as the competition, | APPLICATION |

| | | | | | |
|---|---|---|---|---|---|
| | | | | which is magnetic. That's what we propose on the consumer. Then the industrial sector, it would be more of a compliment to old-school pallets and just movement of heavy equipment." | |
| W1 | "Solutions: Early Detection"; emphasizes novelty, flexibility, cost (Slide 8)<br><br>"Solutions: Equipment"; emphasizes automation, data quality (Slide 9)<br><br>"Solutions: Eradication"; emphasizes specificity and low cost (Slide 10) | "… Early detection prevention costs about one-tenth of the cost of annual maintenance. ...You save 90 percent of your money each year you do an early detection and monitoring as opposed to doing treatment. The second stage of that is this is a massive market. There's about two billion dollars spent annually on invasive species. Mitigation, about half of that is spent of zebra and quahog mussels. They are also spreading rapidly. It's an immediate problem that needs to be solved." | "[W1] Eradication = Specific, Efficient, Scalable<br><br>Species Specific<br><br>Proven Technology in Oncology and Human Health Applications<br><br>Large Scale Production at Low Cost" (slide 9) | "one, detect [invasive species] earlier so that you can mitigate the problem or eradicate the problem immediately. Two, if an issue has been detected, there are methodologies that have been successful at early-stage or low biodiversity stage. They can be eradicated. ... we're developing a chimeric protein that's very specific to only killing zebra mussels and nothing else in the environment. ... we're ... developing an automated sampler that can be installed at problem points and sample the water remotely. You can save time and money. You don't have to send out people constantly to go surveying." | ARGUMENT APPLICATION FINANCIAL |

Whereas T1 had not even identified a value proposition or specific market, problem, or product—in the Kickoff deck, its Demo Day deck included both: it proposed to enter a specific market, the market for high-end consumer products, by developing a hoverboard. Once that product had been marketed, it proposed, it would enter a second market (for industrial pallets). The slide deck included specific benefits and competitive advantages for the identified market—a significant advance in the argument.

I1's value proposition reflected I1's journey by focusing on the customer (hotels): "In-room voice assistants will create a better customer experience for travelers and increase hotel's daily RevPAR (revenue per available room)" (slide 2). Not only does this value proposition focus on a more specific problem (revenue per available room) and market (hotels), it demonstrates the results of I1's customer discovery by naming the appropriate measure that hotels might use.

The other firms also iterated their value propositions in their Demo Day decks. In particular, I2 and I3 each took the tack of presenting a customer's quote as the value proposition—essentially turning their customers into spokespeople. Overall, these value propositions, like W1's, represented stable problem-market relationships that could serve as proposed foundations for building businesses. Unfortunately, SEAL did not ask mentors to assess Demo Day pitches, so we cannot provide mentors' assessments of whether these pitches improved.

## Post-SEAL

During their time in SEAL, all firms in our sample transformed their value propositions along three of the four transformation paths: argument, application, and financial model. As they did, they tended to represent the problem and market more specifically, and in some cases, described a more specific technology to address the problem-market relationship.

For W1 in particular, the iterated value proposition also guided research and development efforts, marketing, and partnerships. We reached out to W1 eight months after Demo Day, and the founder reported lasting effects from their value proposition iteration, specifically from the "aspirin" metaphor. W1 had completed a prototype for automatically sampling lakes for invasive species; completed final validation for their detection technology; and was moving forward with a partner on designing a biopesticide for eradication. The "aspirin" metaphor was now a primary driver in W1's marketing as well as its R&D efforts. In sum, the problematization and interessement achieved in the SEAL program, and represented in W1's final value proposition, had proven stable enough to support the enrollment and mobilization of allies.

Meanwhile, the founder of I1 spent some months attempting to bootstrap his innovation before deciding to give up the idea. He reported that he realized his real interest is in software development, and once he decided to stop pursuing the business, he felt less stressful and more rewarded. T1 continues to work out of a university accelerator. True to its technology-first orientation, T1 has attracted some investment based on the working prototypes it is continuing to develop and is working on customer discovery to identify early adopters.

# Implications

In this paper, we have examined a specific case: how student entrepreneurs iterated their value propositions. Through this qualitative case study, we examined how these entrepreneurs developed claims that their technological innovations could help specific people with specific problems. In keeping with the sociology of translation, we examined incidents in which these firms identified problems (problematization) and the markets or market representatives that faced these problems (interessement), and we identified specific pathways that the firms followed to iterate their value proposition claims. These value propositions would ideally be stable enough to support other entrepreneurial decisions; in some cases, they appear to be.

Callon's sociology of translation has been used in writing studies to better understand the distributed, material nature of arguments (e.g., McNely 2009; Potts 2009; Read & Swarts 2015; Spinuzzi 2010; Spinuzzi et al. 2016; Swarts 2010, 2011, 2016), as has the approach in which it has been based, actor-network theory (e.g., Graham 2015; Lynch & Rivers 2015; Teston 2017). It has also been used more broadly in studies of science and technology (Latour 1996, 2006), including entrepreneurship (Akrich, Callon, & Latour 2002a, b). And it is usually examined as a unified arc of change with four moments. In applying translation to entrepreneurship, however, we have found it useful to separate the four moments of translation, examining the first two moments more closely and directly. We have demonstrated how, in technology entrepreneurship, the first two moments can be—and are frequently expected to be—relatively stabilized in a claim, the value proposition. This claim is then presented in a pitch, which can serve as a trial

before the enrollment and mobilization required to complete translation and cement a lasting alliance. Future work in writing studies could explore whether specific genres, such as the pitch deck, perform similar stabilization work in emergent cross-disciplinary arguments.

For SEAL, an entrepreneurship education program, the pitch is the end of the story. But in a pitch to stakeholders (buyers, investors, partners), the value proposition can be tested and sometimes even co-iterated before being accepted or rejected. That is, during the pitch, the firm attempts to move to the next stage of translation by *enrolling* more allies, and those allies submit it to trials (Latour 1987) before deciding whether to accept that enrollment. The value proposition is relatively stable, but must still be flexible enough to endure this round of co-iteration.

Also specific to entrepreneurship, we have argued that entrepreneurs have at least four avenues open to them as they consider iterating their value propositions: argument, application, design, and financial model. In this case, we have identified examples of three of these avenues and demonstrated how they yielded changes not just to the value proposition as a stated claim, but also to other material decisions a firm made.

As writing researchers examine written arguments in such complex cross-disciplinary domains, we believe, they will need to develop frameworks that adequately examine mutual persuasion with a consensus that emerges over time and across parties. Entrepreneurship, we argue, is a good testbed for this development, and the sociology of translation provides a starting point for it.

# Works Cited


Akrich, M., Callon, M., & Latour, B. (2002a). The key to success in innovation part I: The art of interessement. *International Journal of Innovation Management*, *6*(2 (June)), 187–206.

Akrich, M., Callon, M., & Latour, B. (2002b). The key to success in innovation part II: The art of choosing good spokespersons. *International Journal of Innovation Management*, *6*(2 (June)), 207–255.

Ballantyne, D., & Varey, R. J. (2006). Creating value-in-use through marketing interaction: the exchange logic of relating, communicating and knowing. *Marketing Theory*, *6*(3), 335–348.

Ballantyne, D., Frow, P., Varey, R. J., & Payne, A. (2011). Value propositions as communication practice: Taking a wider view. *Industrial Marketing Management*, *40*(2), 202–210.

Belinsky, S. J., & Gogan, B. (2016). Throwing a Change-Up , Pitching a Strike : An Autoethnography of Frame Acquisition , Application , and Fit. *IEEE Transactions on Professional Communication*, *59*(3), 323–341.

Callon, M. (1986). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of Saint Brieuc Bay. In J. Law (Ed.), *Power, action and belief: A new sociology of knowledge?* (pp. 67–83). Boston: Routledge.

Corbin, J., & Strauss, A. C. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (Third edit). Thousand Oaks, CA: Sage Publications, Inc.

Galbraith, C. S., McKinney, B. C., DeNoble, a. F., & Ehrlich, S. B. (2014). The Impact of Presentation Form, Entrepreneurial Passion, and Perceived Preparedness on Obtaining Grant Funding. *Journal of Business and Technical Communication*, *28*(2), 222–248.

Graham, S. S. (2015). *The politics of pain medicine*. Chicago: University of Chicago Press.

Kowalkowski, C. (2011). Dynamics of value propositions: insights from service-dominant logic. *European Journal of Marketing*, *45*(1/2), 277–294.

Kowalkowski, C., Persson Ridell, O., Röndell, J. G., & Sörhammar, D. (2012). The co-creative practice of forming a value proposition. *Journal of Marketing Management*, *28*(13–14), 1553–1570.

Kristensson, P., Matthing, J., & Johansson, N. (2008). Key strategies for the successful involvement of customers in the co-creation of new technology-based services. *International Journal of Service Industry Management*, *19*(4), 474–491.

Lanning, M. J., & Michaels, E. (1988). A business is a delivery system. *McKinsey Staff Paper*, (41).

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Philadelphia: Open University Press.

Latour, B. (1996). *Aramis, or the Love of Technology*. Cambridge, MA: Harvard University Press.

Latour, B. (2006). *Reassembling the social: An introduction to actor-network-theory*. New York: Oxford University Press.

Lucas, K., Kerrick, S. A., Haugen, J., & Crider, C. J. (2016). Communicating Entrepreneurial Passion: Personal Passion vs. Perceived Passion in Venture Pitches. *IEEE Transactions on Professional Communication*, *59*(4), 363–378.

Lusch, R. F., & Webster, F. E. (2011). A Stakeholder-Unifying, Cocreation Philosophy for Marketing. *Journal of Macromarketing*, *31*(2), 129–134.

Lynch, P., & Rivers, N. (Eds.). (2015). *Thinking with Bruno Latour in Rhetoric and Composition*. Chicago: University of Chicago Press.

McNely, B. J. (2009). Backchannel Persistence and Collaborative Meaning-Making. In B. Mehlenbacher, A. Protopsaltis, A. Williams, & S. Slattery (Eds.), *SIGDOC '09: Proceedings of the 27th ACM international conference on Design of communication* (pp. 297–303). New York: ACM.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (Third Edit). Thousand Oaks, CA: Sage.

Moore, G. A. (1991). *Crossing the chasm: Marketing and selling high-tech products to mainstream customers*. New York: HarperBusiness.

Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. New York: John Wiley & Sons.

Potts, L. (2009). Using Actor Network Theory to Trace and Improve Multimodal Communication Design. *Technical Communication Quarterly*, *18*(3), 281–301.

Propen, A. D., & Schuster, M. L. (2010). Understanding genre through the lens of advocacy: The rhetorical work of the Victim Impact Statement. *Written Communication*, *27*(1), 3–35.

Read, S., & Swarts, J. (2015). Visualizing and Tracing: Articulated Research Methodologies for the Study of Networked, Sociotechnical Activity, Otherwise Known as Knowledge Work. *Technical Communication Quarterly*, *24*(1), 14–44.
Saldaña, J. (2013). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage Publications.
Skålén, P., Gummerus, J., Koskull, C., & Magnusson, P. R. (2014). Exploring value propositions and service innovation: a service-dominant logic study. *Journal of the Academy of Marketing Science*, *43*(2), 137–158.
Soetanto, D., & Jack, S. (2016). The impact of university-based incubation support on the innovation strategy of academic spin-offs. *Technovation*, *50–51*, 25–40.
Spinuzzi, C. (2010). Secret sauce and snake oil: Writing monthly reports in a highly contingent environment. *Written Communication*, *27*(4), 363–409.
Swarts, J. (2010). Recycled Writing: Assembling Actor Networks From Reusable Content. *Journal of Business and Technical Communication*, *24*(2), 127–163.
Swarts, J. (2011). Technological Literacy as Network Building. *Technical Communication Quarterly*, *20*(3), 274–302.
Swarts, J. (2016). Composing Networks: Writing Practices on Mobile Devices. *Written Communication*, *33*(4), 385–417.
Teston, C. (2017). *Bodies in flux*. Chicago: University of Chicago Press.

# Appendix A: Sample codes

| **Theoretical concept** | **Code** | **Description** | **Code type** |
|---|---|---|---|
| Problematization | PROBLEM_STATEMENT | Entrepreneur's analysis of customer complaints: The "diagnosis" | Starter |
| Interessement | ENTITY_CUSTOMER | Entrepreneur characterizations of customers (market) who face the problem or who could use the innovation. | Open |
| | MARKET_PAIN | Customer's complaints that a service is not being provided: The "symptoms" | Open |
| | MARKET_VALIDATION | Entrepreneur characterizes feedback about their idea from market representatives | Open |
| Value proposition | VP_CORE | Statement of the core value proposition | Open |
| | VP_COCREATION | Evidence of developing the value proposition with other parties | Starter |
| | VP_GDL | Describes the positive characteristics of the offering as a good (i.e., Goods-Dominant Logic) | Starter |
| | VP_SDL | Proposes the positive effects of the offering as a service (i.e., Service-Dominant Logic) | Starter |

| | | | |
|---|---|---|---|
| Value proposition iterations (AADF) | VP_ARG | Value proposition: argument is iterated. | Open |
| | VP_USE | Value proposition: application is iterated. | Open |
| | VP_DESIGN | Value proposition: design is iterated. | Open |
| | VP_FINMODEL | Value proposition: financial model is iterated. | Open |

# Appendix B: Interview questions

## Interview questions for SEAL 2017 initial firm interview

- Give me your elevator pitch. What is your innovation?
- Could you describe your value proposition?
- Before SEAL, had you ever pitched an innovation before?
- Where did you get your kickoff deck? How did you prepare for entering SEAL? Did you take other entrepreneurship classes or workshops? Watch other pitches? Read about how to pitch?
- How has your SEAL experience been so far?

## Interview questions for SEAL 2017 final firm interview

- Give me your elevator pitch. What is your innovation?
- Could you describe your value proposition?
- Bottom-line your SEAL training for me. What did you do in the SEAL program?
- What was the most useful aspect of SEAL training? The least useful?
- We tend to see four types of changes in a value proposition: in the argument (claims and evidence); in the proposed use or application; in the technology's design; and in the economic model. Did you change your value proposition along these aspects? For those that you did, how did you decide to make these changes?
- If you could change SEAL in just one way to make it better, what would it be?

## Interview questions for SEAL 2017 retrospective mentor interview

- How did you come to be a SEAL mentor? How long have you served as a SEAL mentor?
- Which teams did you mentor this year?
- As a SEAL mentor, what do you do?
- Discuss your experience with each team. How did they change?
- Discuss each team's changes in their idea, pitch, and value proposition.
- If you could change SEAL in just one way to make it better, what would it be?